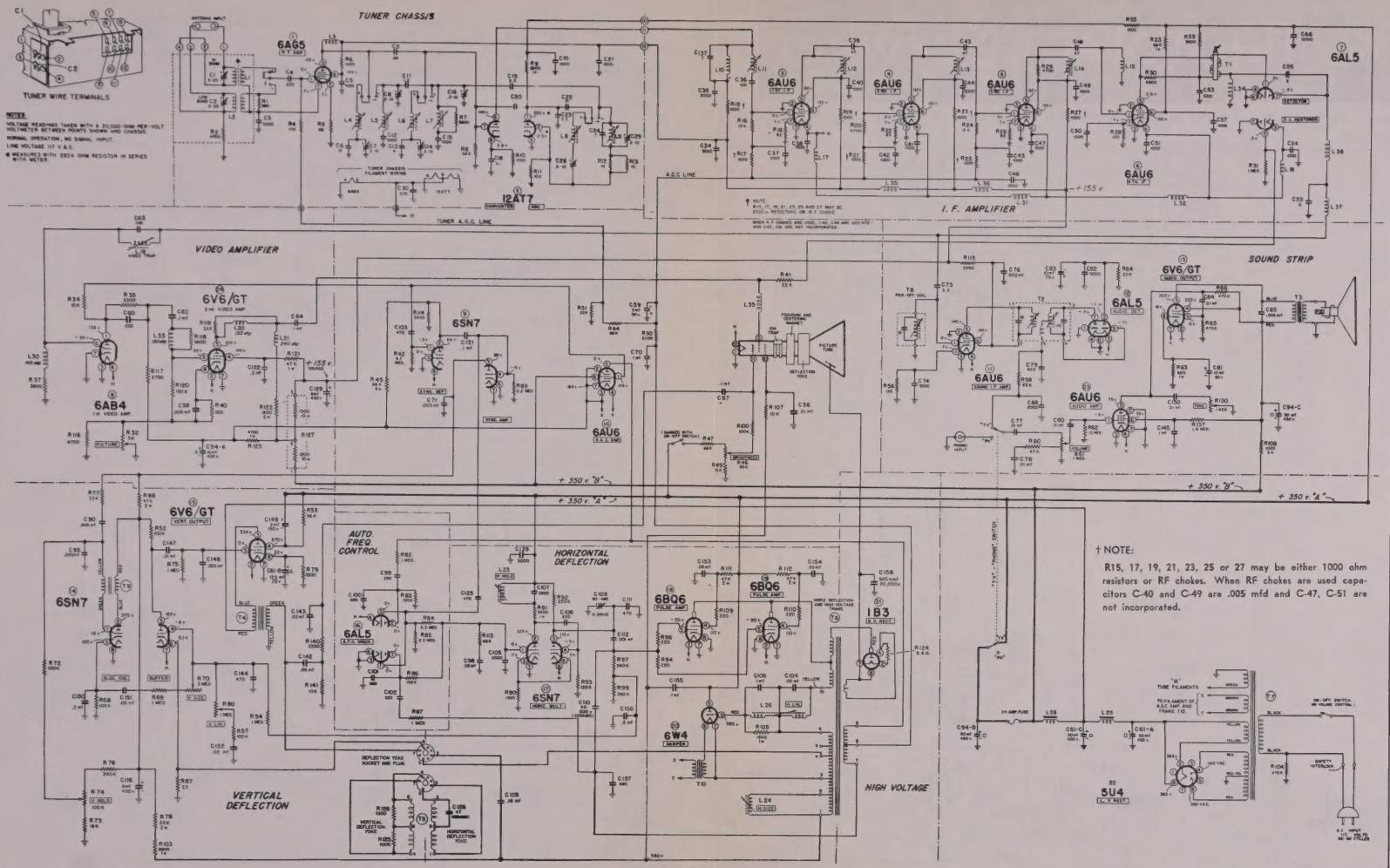
PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO




† NOTE:
R15, 17, 19, 21, 23, 25 or 27 may be either 1000 ohm resistors or RF chokes. When RF chokes are used capacitors C-40 and C-49 are .005 mfd and C-47, C-51 are not incorporated.

Airline Model 15BR-3054A

Schematic Diagram Courtesy of Montgomery Ward & Co.

# The PHOTOFACT Servicer

Vol. 39
Set 385

★ *Published for all users of Howard W. Sams' Photofact Folders* ★ Jan. 1, 1958


The service information in this Servicer provides data on models which we have been unable to present in PHOTOFACT Folders. The receivers are not in current production; a requirement for PHOTOFACT coverage, and we are therefore presenting schematics and supplementary data that will be of assistance when servicing these models.


PROPERTY OF
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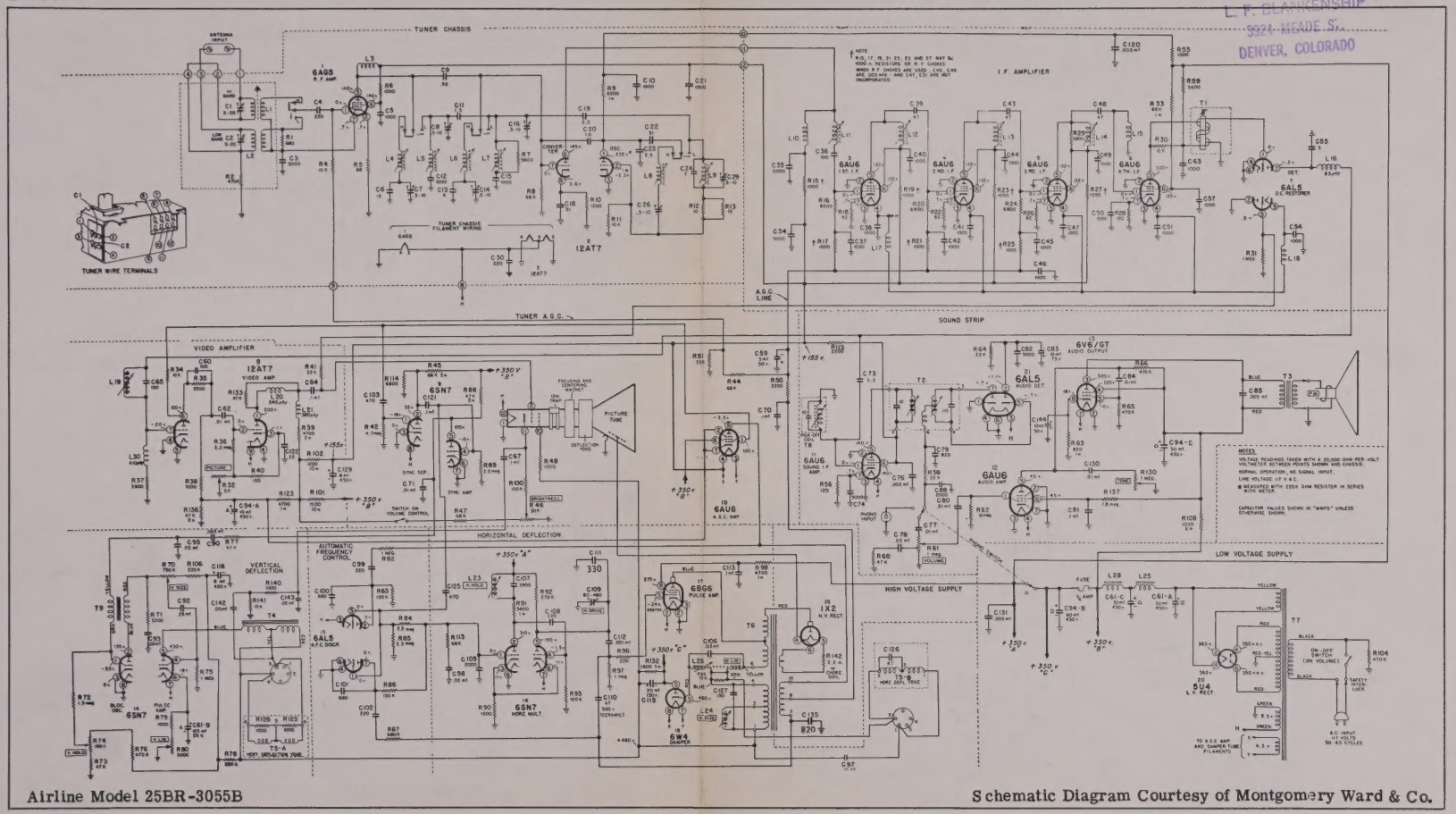
3324 MEADE ST.
DENVER, COLORADO


Airline Model 25BR-3055B

Schematic Diagram Courtesy of Montgomery Ward & Co.

PHOTOFACT* Folder
*TRADE MARK

# CONRAC MODELS CL14, CK14

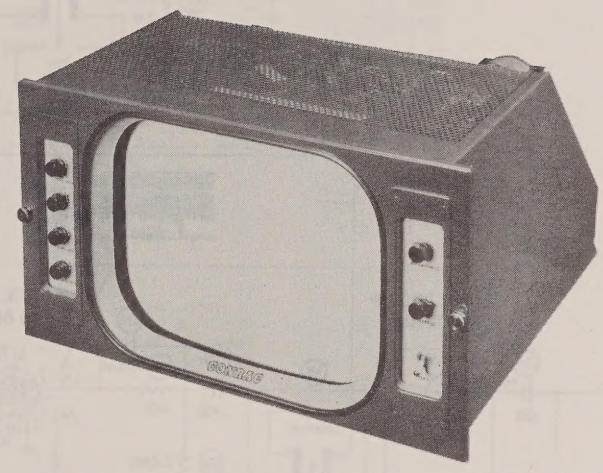
## DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 2 knurled screws holding the front panel and remove the panel.

2. Remove 2 knurled screws accessible after panel removal and 1 chassis bolt from the bottom.

3. Remove the chassis from the front.



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3924 MEADE ST.
DENVER, COLORADO

| | |
|---|---|
| TRADE NAME | Conrac Models CK14, CL14 |
| MANUFACTURER | Conrac Inc., Glendora, California |
| TYPE SET | Television Monitor |
| TUBES | Thirteen |
| POWER SUPPLY | 110-120 or 230 Volts AC, 60 Cycle |

RATING 125 Watts, 1 Amp. @ 117 Volts AC

## SERVICING IN THE FIELD

FOCUS

The focus may be varied by means of a screw in the focus magnet. Using a non-ferrous screwdriver adjust the screw in or out for best focus.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENTS

For adjustment of the horizontal oscillator, set the horizontal hold at the center of its range and adjust the horizontal frequency slug (B3) until the picture synchronizes horizontally. (For location, see tube placement chart).

FUSES

Two fuses are used. One for horizontal sweep circuit protection and one for LV power supply protection. (For location, see tube placement chart).

CENTERING

Centering is accomplished mechanically by means of a centering arm. Adjust the arm from side to side, and up and down until the picture is properly centered.

CONRAC MODELS
CL14, CK14

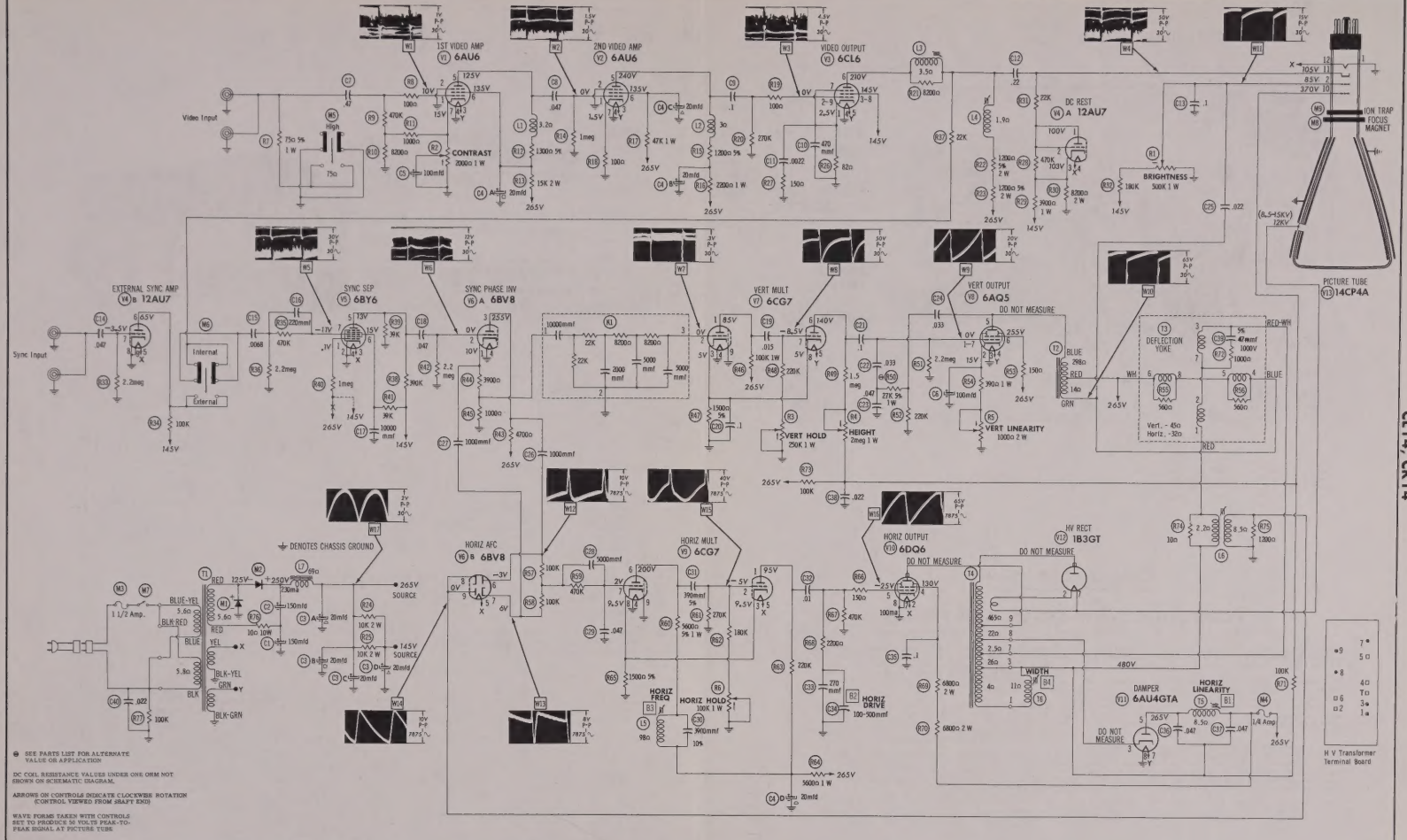
HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1958 Howard W. Sams & Co., Inc., Indianapolis 5, Indiana. Printed in U.S. of America

H283



FOLDER 1




SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM.

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

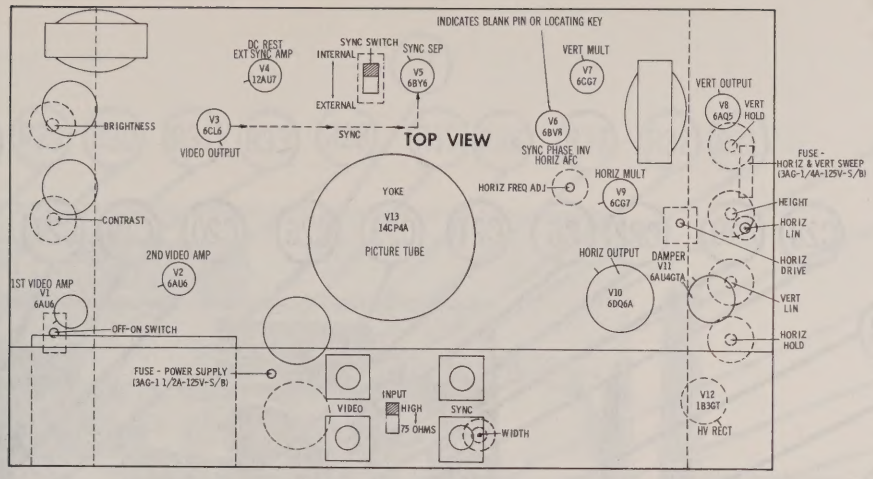
WAVE FORMS TAKEN WITH CONTROLS SET TO PRODUCE 50 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltage measured at 1,000 ohms per volt.
2. Pin numbers are counted in a clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings.
5. All controls set for normal operation; no signal applied.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
Howard W. Sams & Co., Inc. 1958

CONRAC MODELS CL14, CK14

# TUBE PLACEMENT CHART

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# TUBE FAILURE CHECK CHART

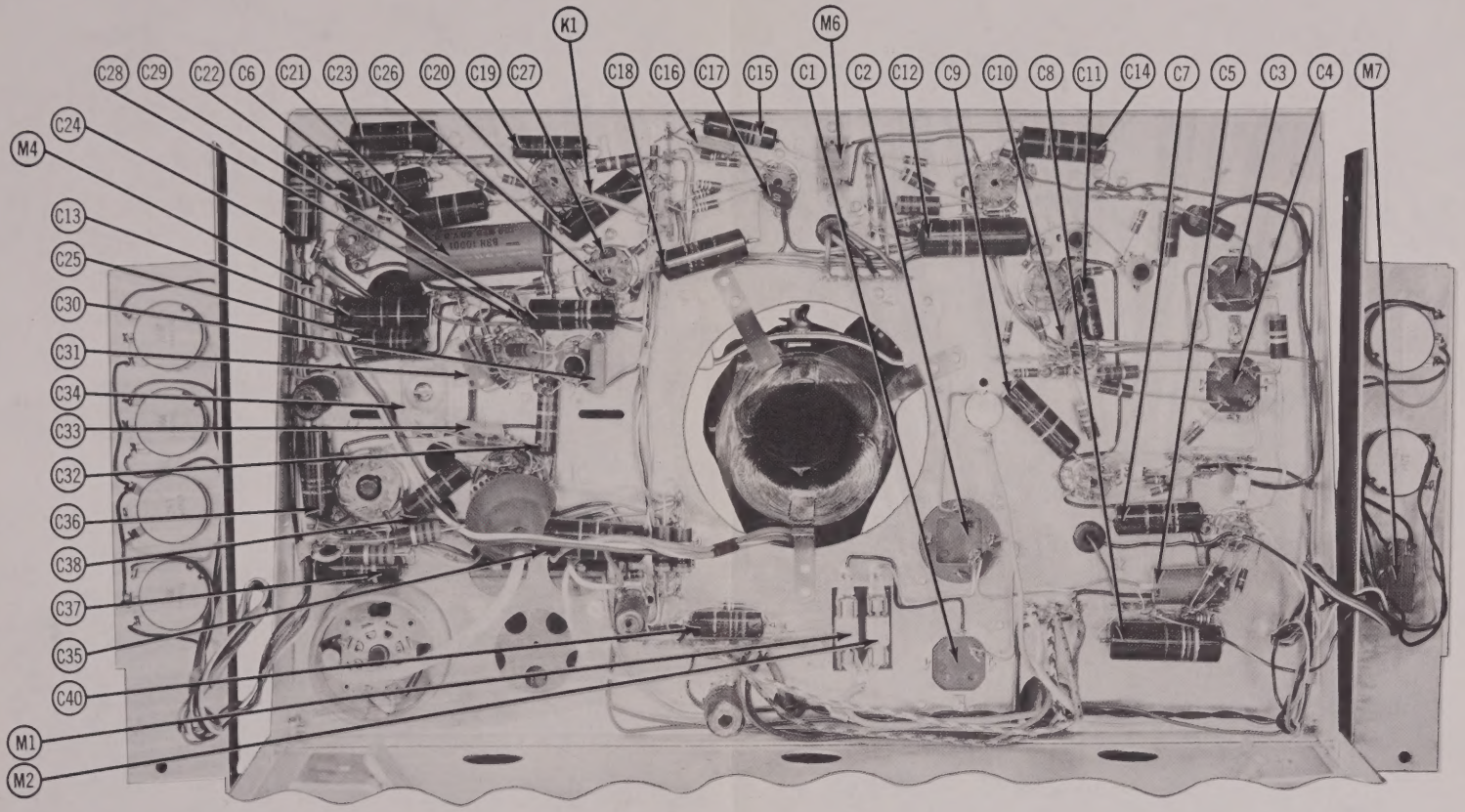
The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - **Fuse (M3), Rectifier (M1, M2)**

LOSS OF PICTURE OR SOUND
No pic, has raster - **V1, V2, V3, V4, V13**

SYNC FAILURE
No vert. sync - **V4, V5, V6**
No horiz. sync - **V4, V5, V6**
No vert. or horiz. sync - **V4, V5, V6**

SWEEP FAILURE
No raster, has sound - **Fuse (M4), V6, V9, V10, V11, V12, V13**
No vertical deflection - **V7, V8**
Poor vert. linearity or foldover - **V7, V8**
Poor horiz. linearity or foldover - **V9, V10, V11**
Narrow picture - **V9, V10, V11, M1, M2**
Vert. off freq. - **V7**
Horiz. off freq. - **V9**




CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

# PARTS LIST AND DESCRIPTIONS

## TUBES ( GENERAL ELECTRIC, SYLVANIA)

| ITEM No. | USE | TYPE | NOTES |
|---|---|---|---|
| V1 | 1st. Video Amp. | 6AU8 | |
| V2 | 2nd. Video Amp. | 6AU8 | |
| V3 | Video Output | 6CL6 | |
| V4 | DC Restorer- Ext. Sync Amp. | 12AU7 | |
| V5 | Sync Sep. | 6BY6 | |
| V6 | Sync Phase Inv.-Horiz. AFC | 6BY8 | |
| V7 | Vert. Mult. | 6CG7 | |
| V8 | Vert. Output | 6AQ8 | |
| V9 | Horiz. Mult. | 6CG7 | |
| V10 | Horiz. Output | 6DQ6A | |
| V11 | Damper | 6AU4GTA | |
| V12 | HV Rectifier | 1B3GT | |

## PICTURE TUBE

| ITEM No. | REPLACEMENT DATA | | | NOTES |
|---|---|---|---|---|
| | CONRAC PART No. | GENERAL ELECTRIC PART No. | SYLVANIA PART No. | |
| V13 | 14CP4A | 14CP4A① | 14CP4A① | ① Silver screen "85" |
| | | 14CP4/14EP4 | 14CP4 | |

## ELECTROLYTIC CAPACITORS

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | CAP. | VOLT. | CONRAC PART No. | AEROVOX PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | PYRAMID PART No. | SANGAMO PART No. | SPRAGUE PART No. |
| C1 | 150 | 200 | | AFHSI-37-25 | XA0315 | FP131 | TMS-34 | S-160 | TVL-1540 |
| C2 | 150 | 200 | | AFHSI-37-25 | XA0315 | FP131 | TMS-34 | S-160 | TVL-1540 |
| C3A | ▲20 | 450 | | AFH4-14 | DO130 | FP444 | TMQ-12 | Q-040 | TVL-4763 |
| B | ▲20 | 450 | | | | | | | |
| C | 20 | 450 | | | | | | | |
| D | ▲20 | 450 | | | | | | | |
| C4A | ▲20 | 450 | | AFH4-14 | DO130 | FP444 | TMQ-12 | Q-040 | TVL-4763 |
| B | 20 | 450 | | | | | | | |
| C | ▲20 | 450 | | | | | | | |
| D | ▲20 | 450 | | | | | | | |
| C5 | 100 | 15 | | PRS15Y100 | BBR100-15 | TC2501 | TD-100-15 | MTH-1510 | TVA-1160 |
| C6 | 100 | 50 | | PRS50Y100 | BR1005 | TC2501 | TD-100-50 | MTH-5010 | TVA-1310 |

## FIXED CAPACITORS

**Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.**

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| | CAP. | VOLT | PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | ERIE PART No. | MALLORY PART No. | SPRAGUE PART No. | |
| C7 | .47 | 200 | | P488N-47 | | CUB22P47 | | GEM-2047 | 2TM-P47 | |
| C8 | .047 | 600 | | P488N-047 | DF-503 | CUB6S47 | | GEM-6147 | 6TM-S47 | |
| C9 | .1 | 400 | | P488N-1 | DT-104 | CUB4P1 | | GEM-401 | 4TM-P1 | |
| C10 | 470 | | | 1467-00047 | D8-471 | 5WS747 | ED-470 | UC-5347 | 1FM-347 | |
| C11 | .0022 | 800 | | P488N-0022 | D6-222 | CUB6D22 | GP-2200 | GEM-6222 | 6TM-D22 | |
| C12 | .22 | 400 | | P488N-22 | | CUB4P22 | | GEM-4022 | 4TM-P22 | |
| C13 | .1 | 400 | | P488N-1 | DF-104 | CUB4P1 | | GEM-401 | 4TM-P1 | |
| C14 | .047 | 600 | | P488N-047 | DF-503 | CUB6S47 | | GEM-6147 | 6TM-S47 | |
| C15 | .0068 | 800 | | P488N-0068 | D6-682 | CUB6D68 | GP-6800 | GEM-6268 | 6TM-D68 | |
| C16 | 220 | | | 1468-00022 | D6-221 | 5WS722 | ED-220 | UC-5322 | 1FM-322 | |
| C17 | 10000 | | | BPD-01 | DD-103 | BYA6S1 | ED-01 | DC511 | 5HK-S1 | |
| C18 | .047 | 600 | | P688N-047 | DF-503 | CUB6S47 | | GEM-6147 | 6TM-S47 | |
| C19 | .015 | 600 | | P688N-015 | DD6-153 | CUB6S15 | ED-015 | GEM-6115 | 6TM-S15 | |
| C20 | .1 | 400 | | P488N-1 | DF-104 | CUB4P1 | | GEM-401 | 4TM-P1 | |
| C21 | .1 | 400 | | P488N-1 | DF-104 | CUB4P1 | | GEM-401 | 4TM-P1 | |
| C22 | .033 | 600 | | P688N-033 | DF-303 | CUB6S33 | | GEM-6133 | 6TM-S33 | |
| C23 | .047 | 600 | | P688N-047 | DF-503 | CUB6S47 | | GEM-6147 | 6TM-S47 | |
| C24 | .033 | 600 | | P688N-033 | DF-303 | CUB6S33 | | GEM-6133 | 6TM-S33 | |
| C25 | .022 | 600 | | P688N-022 | DD-203 | CUB6S22 | ED-022 | GEM-6122 | 6TM-S22 | |
| C26 | 1000 | | | BPD-001 | DD-102 | BYA6D1 | ED-1000 | DC511 | 5HK-D1 | |
| C27 | 1000 | | | BPD-001 | DD-102 | BYA6D1 | ED-1000 | DC511 | 5HK-D1 | |
| C28 | 5000 | | | BPD-005 | DD-502 | BYA6D05 | ED-005 | DC525 | 5HK-D5 | |
| C29 | .047 | 600 | | P688N-047 | DF-503 | CUB6S47 | | GEM-6147 | 6TM-S47 | |
| C30 | 3900 | | | 1464-0039 | | 1R5G39 | CY20C392K | | MS-329 | 10% |
| C31 | 390 | | | | | 5R5T39 | CY15C39J | | MS-339 | 5% |
| C32 | .01 | 600 | | P688N-01 | D6-103 | CUB6S1 | GP-10000 | GEM-611 | 6TM-S1 | |
| C33 | 270 | | | 1469-00027 | D6-271 | 5WS727 | ED-270 | UC-5327 | 1FM-327 | |
| C34 | 300-500 | | | | | | | | | |
| C35 | .1 | 600 | | P688N-1 | DF-104 | CUB6P1 | | GEM-601 | 6TM-P1 | |
| C36 | .047 | 600 | | P688N-047 | DF-503 | CUB6S47 | | GEM-6147 | 6TM-S47 | |
| C37 | .047 | 600 | | P688N-047 | DF-503 | CUB6S47 | | GEM-6147 | 6TM-S47 | |
| C38 | .022 | 600 | | P688N-022 | DD-203 | CUB6S22 | ED-02 | GEM-6122 | 6TM-S22 | |
| C39 | 47 | 1000 | | | | | | | | 5% |
| C40 | .022 | 600 | | P688N-022 | DD-203 | CUB6S22 | ED-02 | GEM-6122 | 6TM-S22 | |

## CONTROLS

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|
| | RESISTANCE | WATTS | CONRAC PART No. | CENTRALAB PART No. | CLAROSTAT PART No. | IRC PART No. | MALLORY PART No. | |
| R1A | 500K | 1 | 1568 | B-59 | A47-500K-S | Q31-133 | U50 | Brightness |
| B | Shaft | | | Not Req. | RS-2 | Not Req. | Not Req. | |
| R2A | 2000Ω | 1 | 1214 | B-5 | A47-2000-S | Q31-110 | U6 | Contrast |
| B | Shaft | | | Not Req. | RS-2 | Not Req. | Not Req. | |
| R3A | 250K | 1 | 1567 | B-50 | A47-250K-S | Q31-130 | U46 | Vert. Hold |
| B | Shaft | | | Not Req. | RS-2 | Not Req. | Not Req. | |
| R4A | 2Meg | 1 | 1564 | B-75 | A47-2Meg-S | Q31-139 | U56 | Height |
| B | Shaft | | | Not Req. | RS-2 | Not Req. | Not Req. | |
| R5A | 1000Ω | 2(WW) | 1751 | WW-102 | A43-1000 | WPS1000 | R1000L | Vert. Lin. |
| B | Shaft | | | Not Req. | RS-2 | Not Req. | 26-35 | |
| R6A | 100K | 1 | 1566 | B-40 | A47-100K-S | Q31-128 | U41 | Horiz. Hold |
| B | Shaft | | | Not Req. | RS-2 | Not Req. | Not Req. | |

## RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

| ITEM No. | RATING OHMS | WATT | CONRAC PART No. | NOTES |
|---|---|---|---|---|
| R7 | 75Ω 5% | 1 | | |
| R8 | 100Ω | | | |
| R9 | 470K | | | |
| R10 | 8200Ω | | | |
| R11 | 1000Ω | | | |
| R12 | 13000 5% | | | |
| R13 | 15K | 2 | | |
| R14 | 1Meg | | | |
| R15 | 12000 5% | | | |
| R16 | 2200Ω | 1 | | |
| R17 | 47K | 1 | | |
| R18 | 100Ω | | | |
| R19 | 100Ω | | | |
| R20 | 270K | | | |
| R21 | 82000 | | | |
| R22 | 12000 5% | 2 | | |
| R23 | 12000 5% | 2 | | |
| R24 | 10K | 2 | | |
| R25 | 10K | 2 | | |
| R26 | 82Ω | | | |
| R27 | 150Ω | | | |
| R28 | 470K | | | |
| R29 | 3900Ω | 1 | | |
| R30 | 82000 | 2 | | |
| R31 | 22K | | | |
| R32 | 180K | | | |
| R33 | 2.2Meg | | | |
| R34 | 100K | 2 | | |
| R35 | 470K | | | |
| R36 | 2.2Meg | | | |
| R37 | 22K | | | |
| R38 | 390K | | | |
| R39 | 39K | | | |
| R40 | 1Meg | | | |
| R41 | 39K | | | |
| R42 | 2.2Meg | | | |
| R43 | 4700Ω | | | |
| R44 | 3900Ω | | | |
| R45 | 1000Ω | | | |
| R46 | 100K | 1 | | |
| R47 | 15000 5% | | | |
| R48 | 220K | | | |
| R49 | 1.5Meg | | | |
| R50 | 27K 5% | 1 | | Note 1 |
| R51 | 2.2Meg | | | |
| R52 | 220K | | | |
| R53 | 150Ω | | | |
| R54 | 3900Ω | 1 | | |
| R55 | 9400Ω | | | |
| R56 | 5600Ω | | | |
| R57 | 100K | | | |
| R58 | 100K | | | |
| R59 | 470K | | | |
| R60 | 95000 5% | 1 | | |
| R61 | 270K | | | |
| R62 | 180K | | | |
| R63 | 220K | | | |
| R64 | 5600Ω | 1 | | |
| R65 | 15000 5% | | | |
| R66 | 150Ω | | | |
| R67 | 470K | | | |
| R68 | 2200Ω | | | |
| R69 | 6800Ω | 2 | | |
| R70 | 6800Ω | 2 | | |
| R71 | 100K | | | |
| R72 | 1000Ω | | | |
| R73 | 100K | | | |
| R74 | 10Ω | | | |
| R75 | 1200Ω | | | |
| R76 | 10Ω | 10 | | |
| R77 | 100K | | | |

Note 1. This is a nominal value and may be altered to correct for compression or stretch at the top of the picture.

## TRANSFORMER (POWER)

| ITEM No. | RATING | | | | REPLACEMENT DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | PRI. | SEC. 1 | SEC. 2 | SEC. 3 | CONRAC PART No. | Halldorson PART No. | Merit PART No. | Stancor PART No. | Thordarson PART No. | Triad PART No. |
| T1 | 230V or 117V | ② 1A | 115V ② 230A | 6.3V ③ 4A | 1701 | | | | | |

## TRANSFORMERS (SWEEP CIRCUITS)

| ITEM No. | USE | REPLACEMENT DATA | | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | | CONRAC PART No. | Halldorson PART No. | Merit PART No. | Ram PART No. | Stancor PART No. | Thordarson PART No. | Triad PART No. | |
| T2 | Vert. Output | 1508 | Z1900 ① | A-2823 ② | V316 ②③ | YO-100 | 25S73 | A-118X | |
| T3A | Yoke- Horiz.(D. 2MH) | | DF605 | MDF-73 | Y70P18/43 | DY-22A | Y-10 | Y-22 ⑤ | |
| B | (70°) Vert. (27.5MH) | | ④ ⑤ ⑥ | ④ ⑤ ⑥ | ④ ⑤ ⑥ | ④ ⑤ ⑥ | ④ ⑤ | NW3 ⑤⑥ | |
| T4 | Horiz. Output | 741C | FB419 * | HVO-36 * | X094 * | HO-256 * | FLY-16 * | D-50 * | |
| T5 | Horiz. Linearity Coil (L 4-11MH) | 1134 | RF800 ⑦⑧ | MWC-5 ⑦ | 20IR15 | WC-8 | WC-22 | WLC-5 | |
| T6 | Width Coil (2. 7-17MH) | 1135 | RF800 ⑦⑨ | MWC-11 | 20IR16 | WC-5 ⑩ | WC-18 ⑦ | WLC-6 | |

① Connect as autoformer.
② Drill new mounting hole(s).
③ Cut and tape blanking lead.
④ Use original horizontal damping network, if necessary.
⑤ Connect horizontal damping network across terminals #2 and #7.
⑥ Use original rear cover, centering device and focus adjustment.
⑦ Enlarge mounting hole.
⑧ Use terminals #3 and #4.
⑨ Use terminals #1 and #2.
⑩ Use red and blue terminals.

### *HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type is Listed

| | ORIGINAL TERMINAL CONNECTIONS | Halldorson Replacement Connections | Merit Replacement Connections | Ram Replacement Connections | Stancor Replacement Connections | Thordarson Replacement Connections | Triad Replacement Connections |
|---|---|---|---|---|---|---|---|
| | 9 | 9 | 9 | 9 | 9 | 9 | 9 |
| | 8 | 7 | 7 | 7 | 7 | 7 | 7 |
| | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Connect Width Coil Across | 3 & 1 | 3 & 1 | 3 & 1 | 3 & 1 | 3 & 1 | 3 & 1 | 3 & 1 |
| Special Notes → | | | | | | | |

## COILS (RF-IF)

| ITEM No. | USE | REPLACEMENT DATA | | | | | NOTES |
|---|---|---|---|---|---|---|---|
| | | CONRAC PART No. | Meissner PART No. | Merit PART No. | Miller PART No. | Ram PART No. | |
| L1 | Shunt Peaking Coil | 1784 | | | | | 25 Microhenries |
| L2 | Shunt Peaking Coil | 1795 | 19-6022 | TV-192 | 6152 | | 21 Microhenries |
| L3 | Series Peaking Coil | 1758 | | | 4563 | | Set ② 35 Microhenries |
| L4 | Shunt Peaking Coil | 1169 | 19-1920 | | 4563 | | Set ② 67.7 Microhenries |

## TRANSFORMER (HORIZ. OSC.)

| ITEM No. | DC RES. | | REPLACEMENT DATA | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | PRI. | SEC. | CONRAC PART No. | Meissner PART No. | Merit PART No. | Miller PART No. | Ram PART No. | Thordarson PART No. | |
| L5 | 98Ω | | 994 | 19-1576 | TV-103 | 6210 | H-102 | HS-5 | 20-45 Microhenries Horiz. Freq. Horiz. AFC |
| L6 | 3.3Ω | 8.5Ω | 849 | | | | | | |

## FILTER CHOKE

| ITEM No. | RATINGS | | | REPLACEMENT DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | TOTAL DIRECT CURRENT | D. C. RESISTANCE | INDUCTANCE @ CURRENT (000 ~) | CONRAC PART No. | Halldorson PART No. | Merit PART No. | Stancor PART No. | Thordarson PART No. | Triad PART No. |
| L7 | 230A | 98Ω | 3.3 Hy. | 1056 | C5037 | C-2906 | C-2334 ① | 28C98 | C-17X |

① Drill new mounting hole.

## COMPONENT COMBINATIONS

| ITEM No. | USE | DESCRIPTION | CONRAC PART No. | REPLACEMENT DATA | |
|---|---|---|---|---|---|
| R1 | Vert. Integrator | 10000mmf, 2000mmf, 5000mmf, 5000mmf, 22K, 22K, 82000, 82000 | | Aerovox<br>Centralab<br>Sprague<br>Erie | PA-111<br>PC-101<br>Y-5<br>1405-02 |

## RECTIFIERS

| ITEM No. | RATING | REPLACEMENT DATA | | | | | NOTES |
|---|---|---|---|---|---|---|---|
| | CURRENT (Measured) | CONRAC PART No. | FEDERAL PART No. | GENERAL ELECTRIC PART No. | INTERNATIONAL PART No. | SARKES TARZIAN PART No. | |
| M1 | .240A | | | | | M500 ① | ① Silicon type |
| M2 | .240A | | | | | M500 ① | |

## FUSES

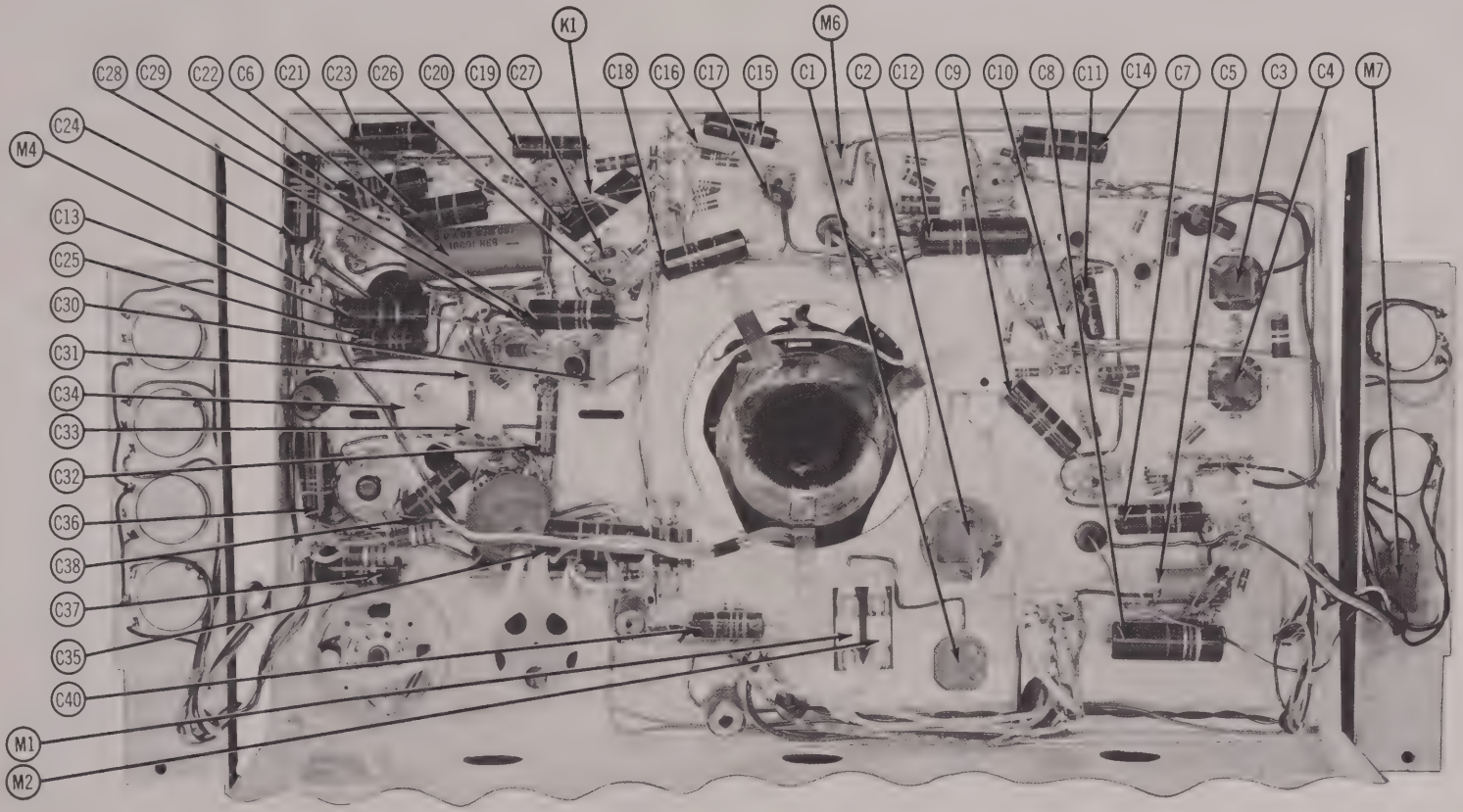
| ITEM No. | TYPE | RATING | REPLACEMENT DATA | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | CONRAC PART No. | | LITTELFUSE PART No. | | BUSS PART No. | |
| | | | FUSE | HOLDER | FUSE | HOLDER | FUSE | HOLDER |
| M3 | 3AG | 1 1/2A 125V | | | 31301.5 (3AG 1 1/2A-125V - S/B) | 342001 | MDL 1 1/2 | HKP |
| M4 | 3AG | 1/4A 125V S/B P/T | | | 315.250 (3AG 1/4A-125V-S/B-P/T) | | MDV 1/4 | |

## MISCELLANEOUS

| ITEM No. | PART NAME | CONRAC PART No. | NOTES |
|---|---|---|---|
| M5 | Switch | | Input (High or 75Ω) Slide Type DPDT |
| M6 | Switch | | Sync - Internal or External (Slide type DPDT) |
| M7 | Switch | | On-off (Toggle Type) |
| M8 | Focus Magnet | | Includes centering device and yoke cover |
| M9 | Ion Trap | | |

CONRAC MODELS CL14, CK14

FOLDER 1

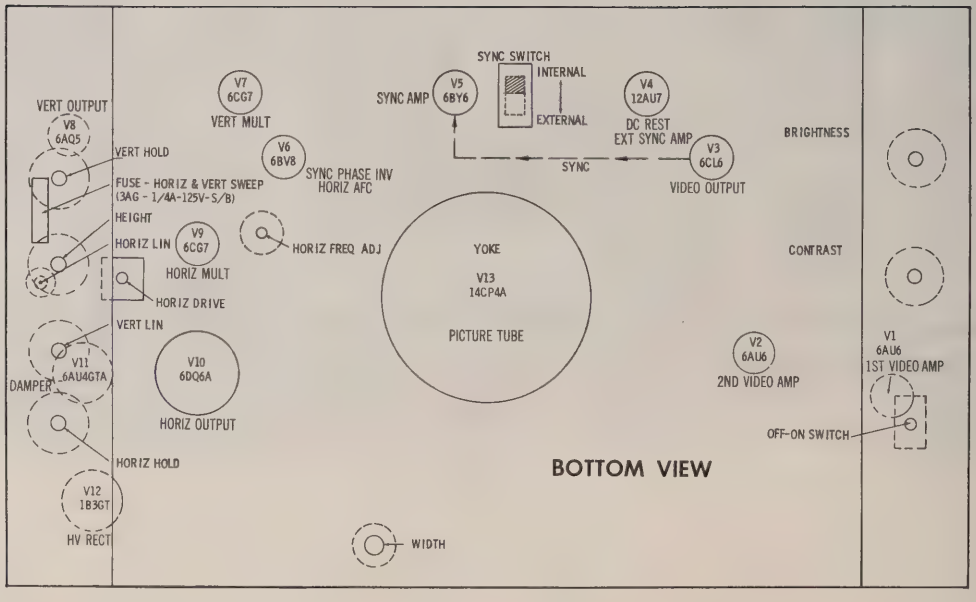



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

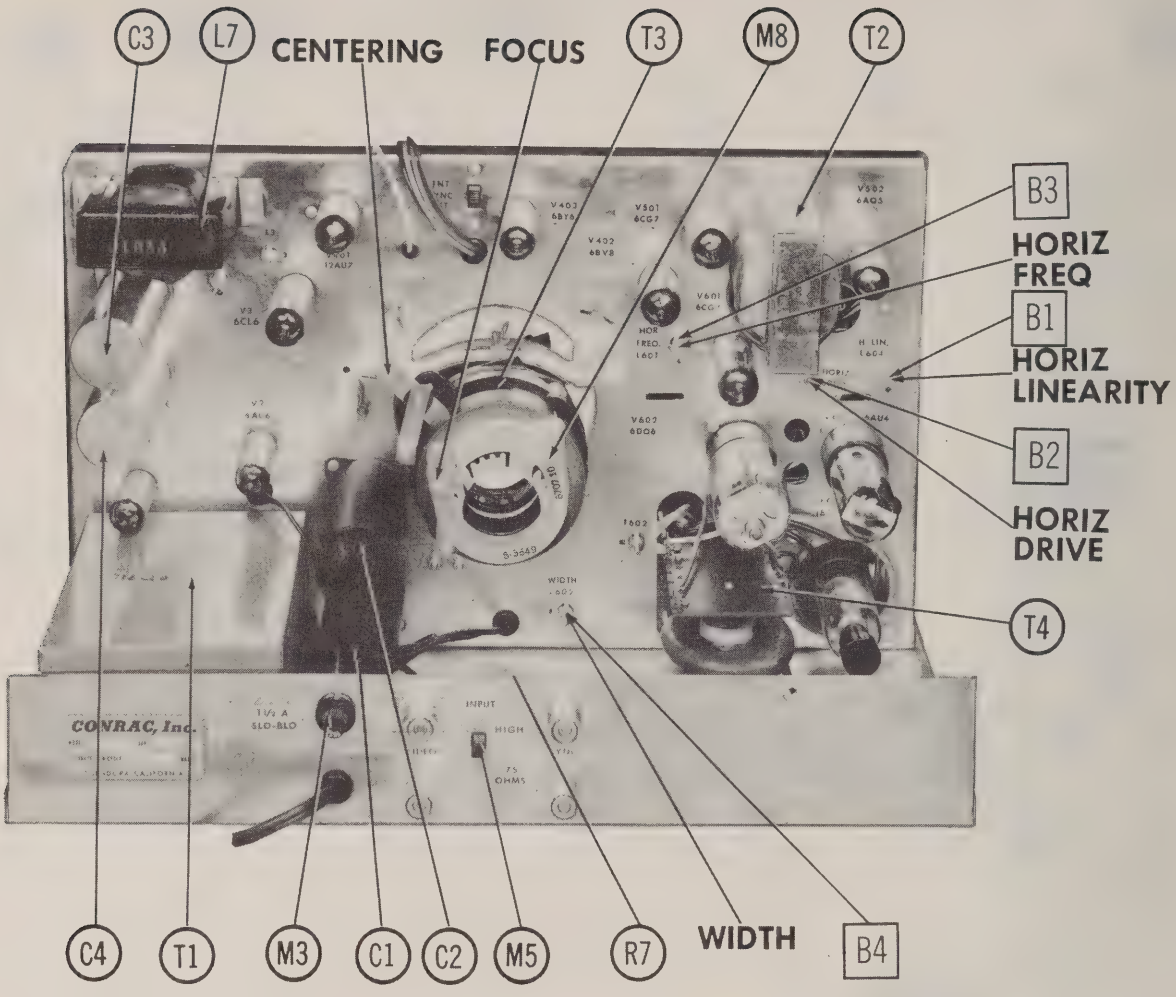
# RESISTANCE MEASUREMENTS

| ITEM | TUBE | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 | Pin 8 | Pin 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| V1 | 6AU6 | 470K | 0Ω | .1Ω | 0Ω | †16K | †15K | 1600Ω | | |
| V2 | 6AU6 | 1Meg | 0Ω | .1Ω | 0Ω | †3400Ω | †47K | 100Ω | | |
| V3 | 6CL6 | 82Ω | 270K | †5000Ω | 0Ω | .1Ω | †2400Ω | 82Ω | †5000Ω | 270K |
| V4 | 12AU7 | †475K | †475K | 7500Ω | .1Ω | .1Ω | †105K | 2.2Meg | 0Ω | 0Ω |
| V5 | 6BY6 | †1Meg | 0Ω | .1Ω | 0Ω | †395K | †44K | 2.7Meg | | |
| V6 | 6BV8 | 4900Ω | 2.2Meg | †4700Ω | 0Ω | .1Ω | INF | INF | 8.5Ω | 8.5Ω |
| V7 | 6CG7 | †100K | 60K | 1500Ω | 0Ω | .1Ω | • ‡2.4Meg | • 240K | 1500Ω | 0Ω |
| V8 | 6AQ5 | 2.2Meg | • 800Ω | 0Ω | .1Ω | †298Ω | †150Ω | 2.2Meg | | |
| V9 | 6CG7 | †225K | • 100K | 1500Ω | 0Ω | .1Ω | †11K | INF | 1500Ω | 0Ω |
| V10 | 6DQ6A | TP | .1Ω | NC | †13K | 470K | NC | 0Ω | 0Ω | TOP CAP ‡22Ω |
| V11 | 6AU4GTA | NC | NC | ¶ | NC | †8.5Ω | NC | .1Ω | 0Ω | |
| V12 | 1B3GT | PINS 1 THRU 8 HAVE INFINITE RESISTANCE | | | | | | | | TOP CAP ‡487Ω |
| V13 | 14CP4A | 0Ω | • 165K | PIN 10 ‡100K | PIN 11 500K | PIN 12 .1Ω | | | | |

¶ THIS READING CAN VARY GREATLY, (10K MINIMUM), DUE TO THE CONDITION OF THE ELECTROLYTIC CAPACITOR CONNECTED IN THE ASSOCIATED CIRCUIT.
• THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.
† MEASURED FROM 265V SOURCE.
‡ MEASURED FROM PIN 3 OF V11.
NC NO CONNECTION.
TP TIE POINT.




# TUBE PLACEMENT CHART




## CHASSIS– TOP VIEW

## HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV signal, preferably with a test pattern. Adjust the horizontal linearity (B1) for best symmetry while observing the right half of a test pattern with respect to the left half.

Turn the horizontal drive trimmer (B2) slowly counter clockwise until the picture becomes quite narrow and somewhat dim. Set the horizontal hold control for normal synchronization. Increase the drive by turning B2 clockwise until either the picture falls out of sync or a "Drive Line" (bright vertical bar or line) appears near the center of the screen. In either case, turn B2 back counter clockwise until the conditions just disappear.

Set the horizontal hold control to the center of its range. Temporarily ground pin 2 (grid) of the sync phase inverter (6BV8, V6). Adjust the horizontal frequency slug (B3) until the pattern on the screen is upright and almost stationary. This should produce optimum operation. If it is desirable maintain better stability, but decrease its pull-in range, temporarily ground the grid of V6 as above, set the horizontal hold control near its maximum resistance end with the pattern leaning toward 10 o'clock, and adjust the horizontal frequency slug (B3) until the picture is nearly synchronized as above. Similarly, if the horizontal hold control is set near the minimum resistance end and the above adjustments are made, greater pull-in range and less horizontal stability will be the result.

If it is desirable that both edges of the picture be visible turn the width slug (B4) counter clockwise to nearly the end of its range. Turn B4 almost fully clockwise for operation with the picture filling the screen. The slug may be set anywhere between these two positions for operation without any consequence to the operation of the unit.

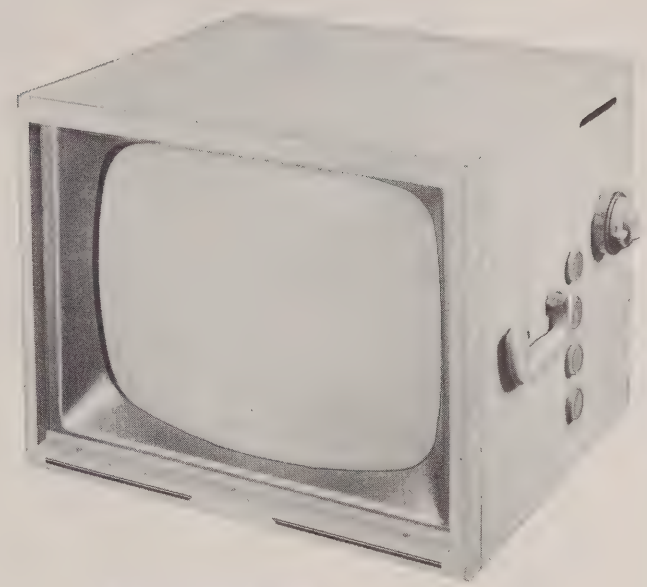
If it is necessary to operate the monitor with reduced scan, turn the width slug (B4) as far counter clockwise as possible without producing vertical white bars near the center of the raster. Turn the horizontal drive trimmer (B2) as far counter clockwise as possible without objectionable loss of high voltage.

# HALLICRAFTERS MODELS 17TS740B, M, 17TS760B, BJX, M, 17TS780B, M (Ch. A2007, E2007)

## DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 8 push-on type knobs from the side.
2. Remove 2 wood screws and the rear cover.
3. Remove 2 wood screws and AC interlock.
4. Remove picture tube socket, ion trap, yoke clamp, yoke, HV lead and 2 speaker leads.
5. Remove 2 wood screws and the speaker.
6. Remove 1 wood screw from the top chassis brace.
7. Remove 2 chassis bolts from the bottom.
8. Remove the chassis.



CAUTION NOTE

ONE SIDE OF AC LINE CONNECTED TO CHASSIS
Care should be exercised when connecting test equipment or physically contacting the chassis.

PROPERTY OF
L. E. BLANKENSHIP
DENVER, COLO.

| TRADE NAME | Hallicrafters | MODELS | CHASSIS |
|---|---|---|---|
| | | 17TS740B, 17TS740M, 17TS760B, 17TS760M, 17TS780B, 17TS780M | A2007 |
| | | 17TS760BJX | E2007 |
| MANUFACTURER | The Hallicrafters Co., 4401 W. 5th. Ave., Chicago 24, Illinois | | |
| TYPE SET | Television Receiver | | |
| TUBES | Fourteen | | |
| POWER SUPPLY | 110-120 Volts AC, 60 Cycle | RATING 145 Watts, 1.2 Amp. @ 117 Volts AC | |
| TUNING RANGE | Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier) | | |

## SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

For touch-up adjustment of the VHF oscillator it is necessary to remove the chassis from the cabinet. (See disassembly instructions).

PICTURE TUBE SAFETY GLASS CLEANING

Remove 3 wood screws and plastic trim at the bottom. Remove the safety glass.

FOCUS

The focus may be varied by the position of a strap on the base of the picture tube. The strap can be connected between pins 6 and 10, or 6 and 2. Readjust the ion trap for the best focus consistent with maximum brightness.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

For adjustment of the horizontal oscillator, it is necessary to remove the rear cover and supply power to set. Set the horizontal hold at the center of its range and adjust the horizontal frequency slug (B1) until the picture synchronizes horizontally. (For location, see tube placement chart).

FUSE DEVICE

A 4.7Ω fusible resistor (R74) is used for LV power supply protection. (For location, see tube placement chart).

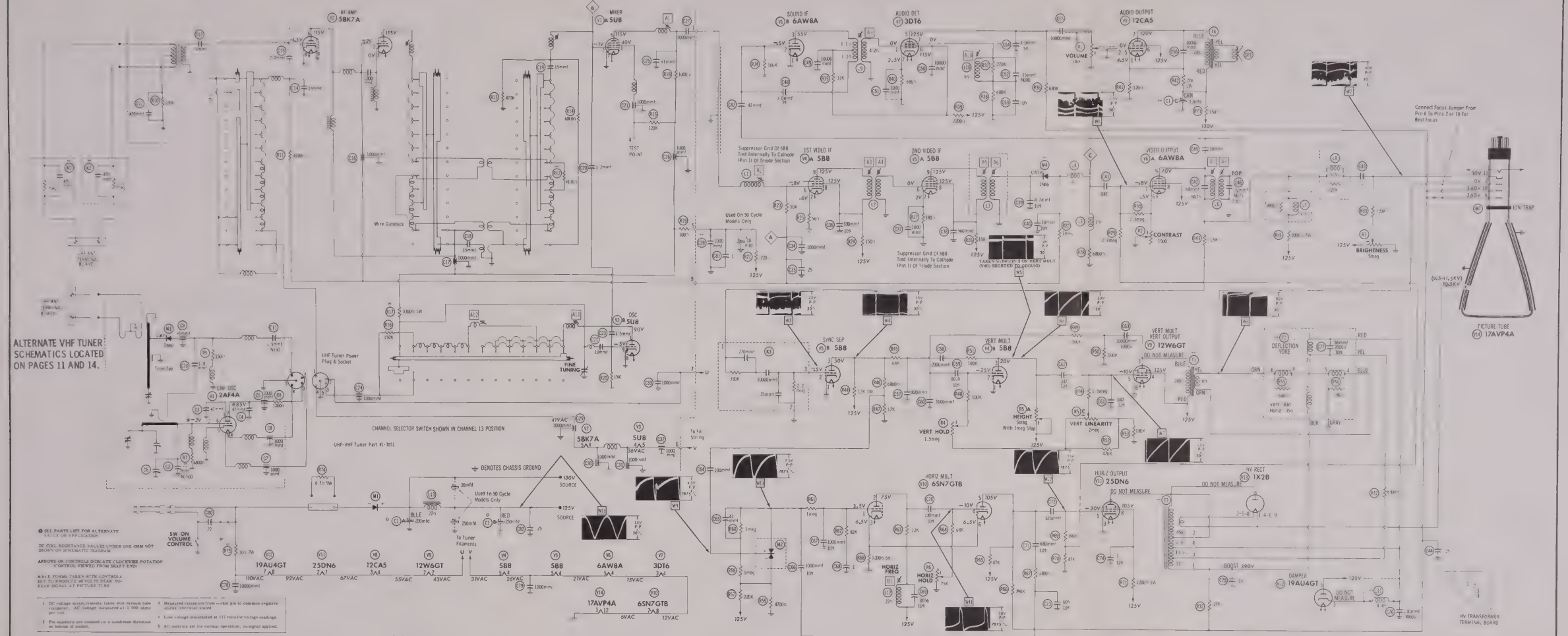
CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube. Rotate the two rings around the neck of the tube until the picture is properly centered.

HALLICRAFTERS MODELS 17TS740B, M, 17TS760B, BJX, M, 17TS780B, M (Ch. A2007, E2007)

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

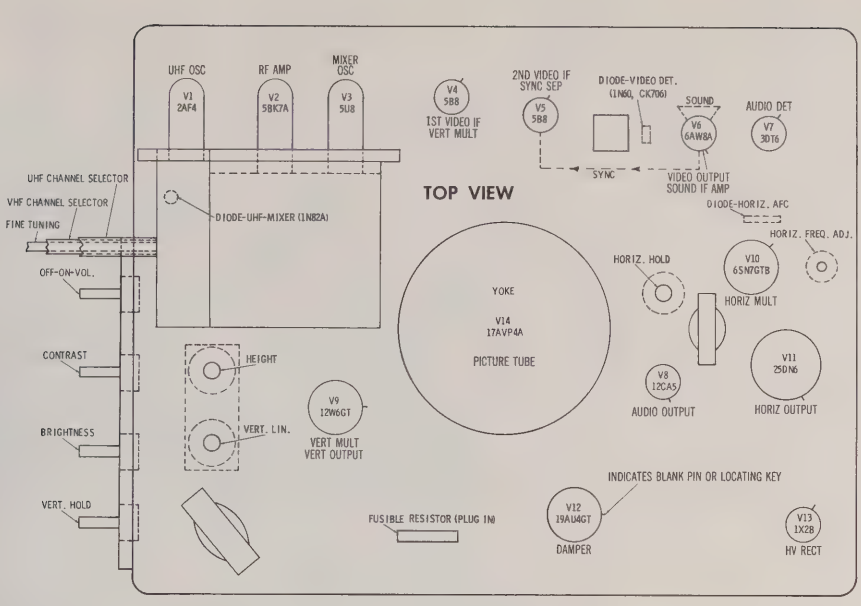
The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1958 Howard W. Sams & Co., Inc., Indianapolis 5, Indiana. Printed in U.S. of America


ALTERNATE VHF TUNER SCHEMATICS LOCATED ON PAGES 11 AND 14.
RF AMP V2 5BK7A
MIXER V1-A 5U8
SOUND IF V8-B 6AW8A
AUDIO DET V7 3DT6
AUDIO OUTPUT V6 12CA5
VOLUME
1ST VIDEO IF V4-A 5B8
2ND VIDEO IF V5-A 5B8
VIDEO O'PUT V6-A 6AW8A
CONTRAST
BRIGHTNESS
TOP
ION TRAP
PICTURE TUBE V14 17AVP4A
DEFLECTION YOKE
Connect Focus Jumper From Pin 6 To Pins 2 or 10 For Best Focus
Wire Gimmick
TEST POINT
Suppressor Grid Of 5B8 Tied Internally To Cathode (Pin 11 Of Triode Section
Used On 50 Cycle Models Only
TAKEN WITH PIN 2 OF VERT MULT (V4B) SHORTED TO GROUND
UHF Tuner Power Plug & Socket
UHF OSC V1 2AF4A
OSC V3 5U8
FINE TUNING
UHF-VHF Tuner Part #L-3051
CHANNEL SELECTOR SWITCH SHOWN IN CHANNEL 13 POSITION
DENOTES CHASSIS GROUND
To 1st String
Used In 50 Cycle Models Only
To Tuner Filaments
130V SOURCE
125V SOURCE
SW ON VOLUME CONTROL
SYNC SEP V5-B 5B8
VERT MULT V4-B 5B8
VERT MULT VERT OUTPUT V9 12W6GT
DO NOT MEASURE
VERT HOLD 1.5meg
HEIGHT 5meg With 1meg Stop
VERT LINEARITY 2meg
HORIZ MULT V10 6SN7GTB
HORIZ FREQ
HORIZ HOLD
HORIZ OUTPUT V11 25DN6
HV RECT V13 1X2B
BOOST 390V
DAMPER V12 19AU4GT
HV TRANSFORMER TERMINAL BOARD
19AU4GT 7A8 110VAC
25DN6 7A1 92VAC
12CA5 3A4 67VAC
12W6GT 7A2 55VAC
5B8 5A4 43VAC
5B8 5A4 31VAC
6AW8A 3A4 26VAC
3DT6 3A4 21VAC
17AVP4A 3A12 6VAC
6SN7GTB 7A8 15VAC 12VAC
SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION OF CONTROL VIEWED FROM SHAFT END
WAVE FORMS TAKEN WITH CONTROLS SET TO PRODUCE 40 VOLTS PEAK TO-PEAK SIGNAL AT PICTURE TUBE
1 DC voltage measurements taken with vacuum tube voltmeter. AC voltage measured at 1 000 ohms per volt.
2 Pin numbers are counted in a clockwise direction as bottom of socket.
3 Measured values are from socket pin to common negative unless otherwise stated
4 Line voltage maintained at 117 volts for voltage readings
5 All controls set for normal operation, no signal applied.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
Howard W. Sams & Co., Inc. 1957

**HALLICRAFTERS MODELS 17TS740B, M, 17TS760B, BJX, M, 17TS780B, M (Ch. A2007, E2007)**

# TUBE PLACEMENT CHART




# TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

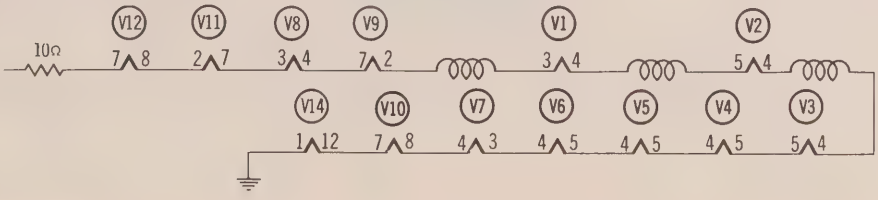
POWER SUPPLY FAILURE
No raster, no sound - **Fusible Resistor (R74), Rectifier (M1)**

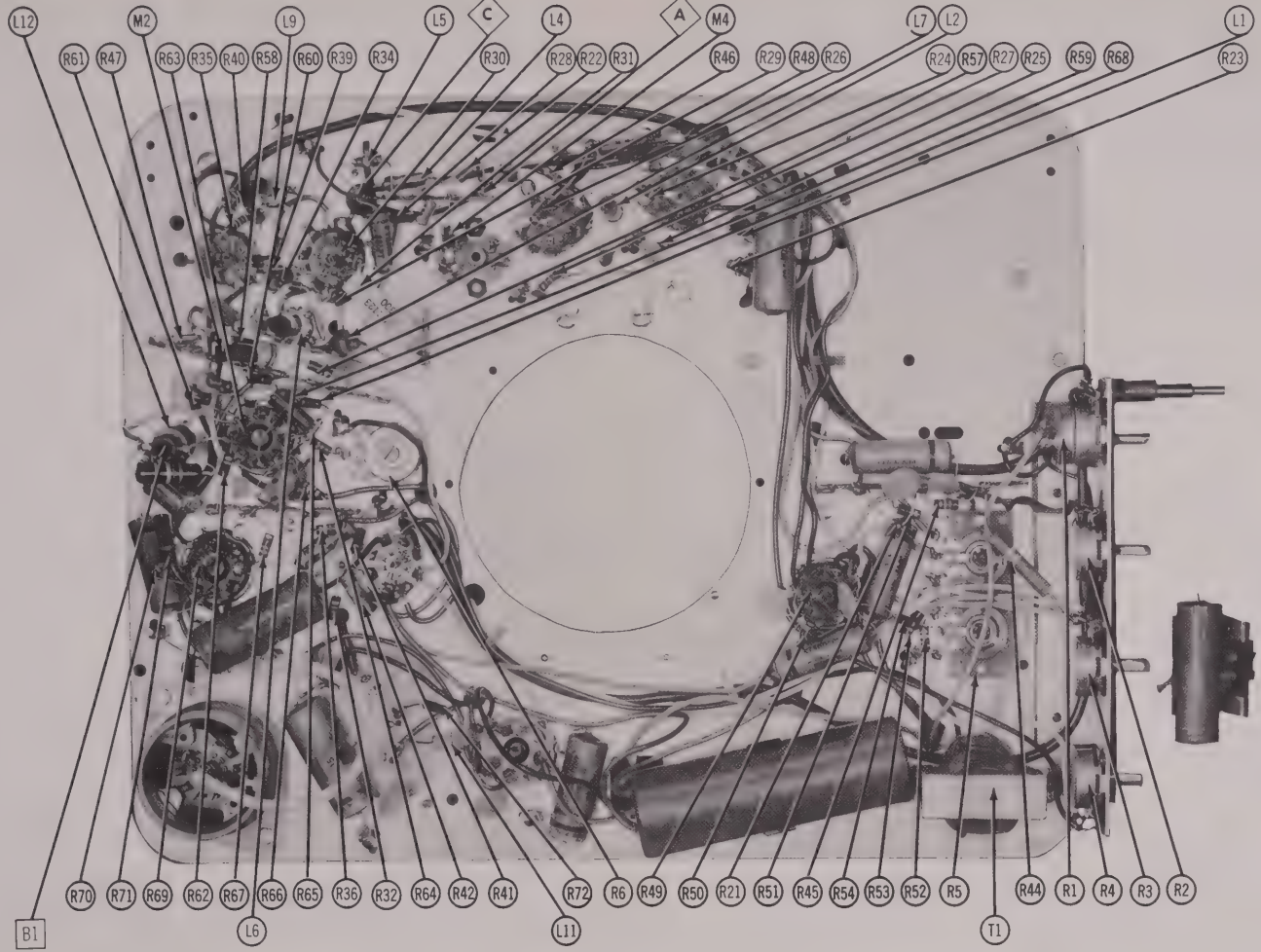
LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V4, V5, Diode (M4), V6**
No pic, no sound, has snow - **V2, V3, (V1 UHF)**
No pic, has sound, has raster - **V6, V14**
Has pic, no sound - **V6, V7, V8**

SYNC FAILURE
No vert. sync - **V5**
No horiz. sync - **V5, Diode (M2)**
No vert. or horiz. sync - **V5**

SWEEP FAILURE
No raster, has sound - **M2, V10, V11, V12, V13, V14**
No vertical deflection - **V4, V9**
Poor vert. linearity or foldover - **V4, V9**
Poor horiz. linearity or foldover - **V10, V11, V12**
Narrow picture - **V10, V11, V12, M1**
Vert. off freq. - **V4, V9**
Horiz. off freq. - **V10**

**This receiver employs tubes used in a series filament network, an open filament in any tube in the series will cause the set to be inoperative. (See circuit below)**






CHASSIS BOTTOM VIEW - RESISTOR INDUCTOR OF ALIGNMENT IDENTIFICATION

# ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

USE AN ISOLATION TRANSFORMER TO PROTECT THE TEST EQUIPMENT.
Allow a 20 minute warm-up period for the receiver and test equipment.
The high voltage lead should be securely taped and kept away from the chassis.

VIDEO IF ALIGNMENT

Connect the negative lead of a 3 volt bias supply to point (A). Positive to chassis.
Disable the oscillator section of the mixer oscillator tube by replacing with one having the oscillator grid pin removed.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide a usable pattern on scope.
Use 10MC sweep unless otherwise noted.

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 1. | 1000MMF | High side to point (B). Low side to chassis. | 44.5MC | 42.75MC 45.75MC | Any non-interfering channel | Vert. Amp. thru detector (Fig. 1) to pin 9 (plate) of 5B8 (V4). Low side to chassis. | A1, A2 | Adjust for maximum gain and symmetry of response similar to Fig. 2 with markers as shown. |
| 2. | " | High side to pin 6 (grid) of 5B8 (V4). Low side to chassis. | " | " | " | Vert. Amp. thru detector (Fig. 1) to pin 9 (plate) of 5B8 (V5). Low side to chassis. | A3, A4 | " |
| 3. | " | High side to pin 6 (grid) of 5B8 (V5). Low side to chassis. | " | " | " | Vert. Amp. to point (C). Low side to chassis. | A5, A6 | " |
| 4. | " | High side to point (B). Low side to chassis. | " | " | " | " | | Check for response curve similar to Fig. 3. If necessary, SLIGHTLY retouch A1 thru A6 for desired response. |

SOUND IF ALIGNMENT

Set the contrast control fully clockwise.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide a usable pattern on scope.

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 5. | 1000MMF | High side to point (C). Low side to chassis. | Not used | 4.5MC (30% 400~ AM Mod) | Any non-interfering channel | Vert. Amp. thru detector (Fig. 4) to pin 11 (cathode) of picture tube. | A7 | Preset A7 fully clockwise. Preset A10 fully counter clockwise. Turn A7 counter clockwise for MINIMUM 400~ indication on scope. |
| 6. | " | " | 4.5MC (7.5KC Swp) | Not used | " | Across secondary of audio output transformer (T4). | A8, A9, A10 | Keep signal input below limiting level of 3DT6 (audio detector, V7). Adjust A8, A9, & A10 for maximum scope indication. |

Connect antenna and tune in a TV station with strong signal. Retouch A8 for MINIMUM buzz. Repeat step 2.

OSCILLATOR ALIGNMENT Tuner Part #1-3051, 1-3067

Restore the receiver to normal operating condition. Set the channel selector to the highest high band channel (13-7) operating in the area and set the fine tuning to the center of its range. Adjust the high band oscillator adjustment (A11) for best picture and sound.
Switch channel selector to the highest low band channel (6-2) operating in the area and adjust the low band oscillator adjustment (A12) for best picture and sound.

RF AND MIXER ALIGNMENT

This portion of the receiver has been properly aligned at the factory and is very stable. Alignment of this portion should not be required in the field.

OSCILLATOR ALIGNMENT FOR TUNER PART #1D3052, 1D3213

Set the fine tuning at the center of its range. The adjustments are accessible, one at a time, as the channel selector is rotated. Adjust for best picture and sound.

RF AND MIXER ALIGNMENT

This portion of the receiver has been properly aligned at the factory and is very stable. Alignment of this portion should not be required in the field.

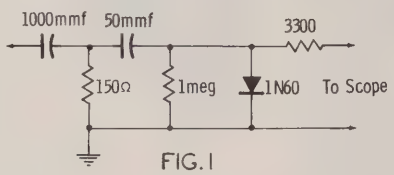


FIG. 1

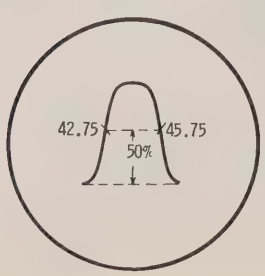


FIG. 3

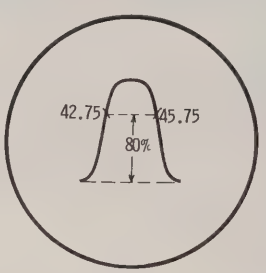


FIG. 2

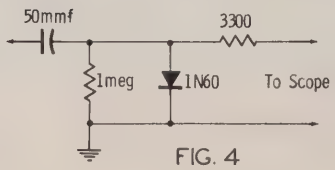
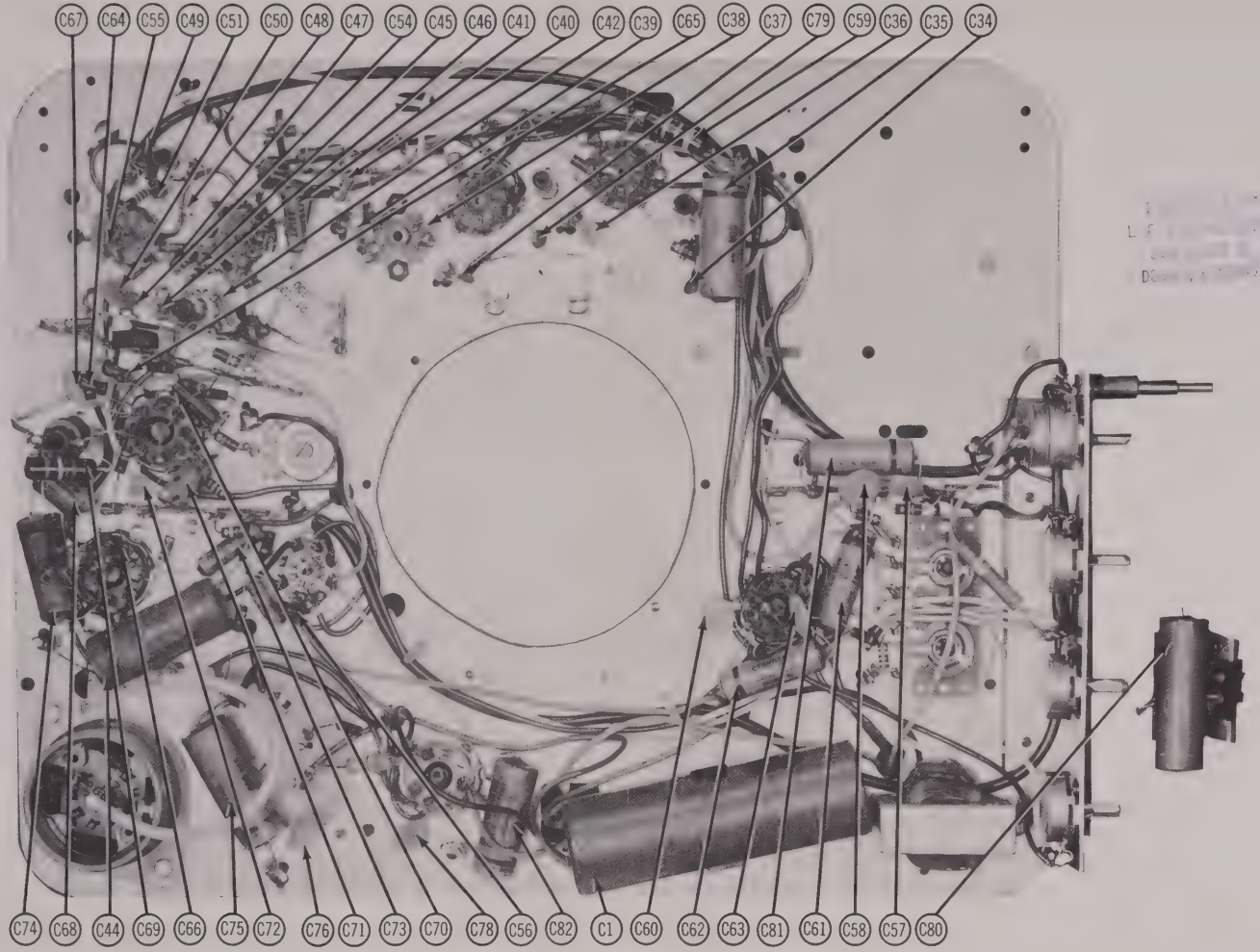


FIG. 4

CHASSIS TOP VIEW

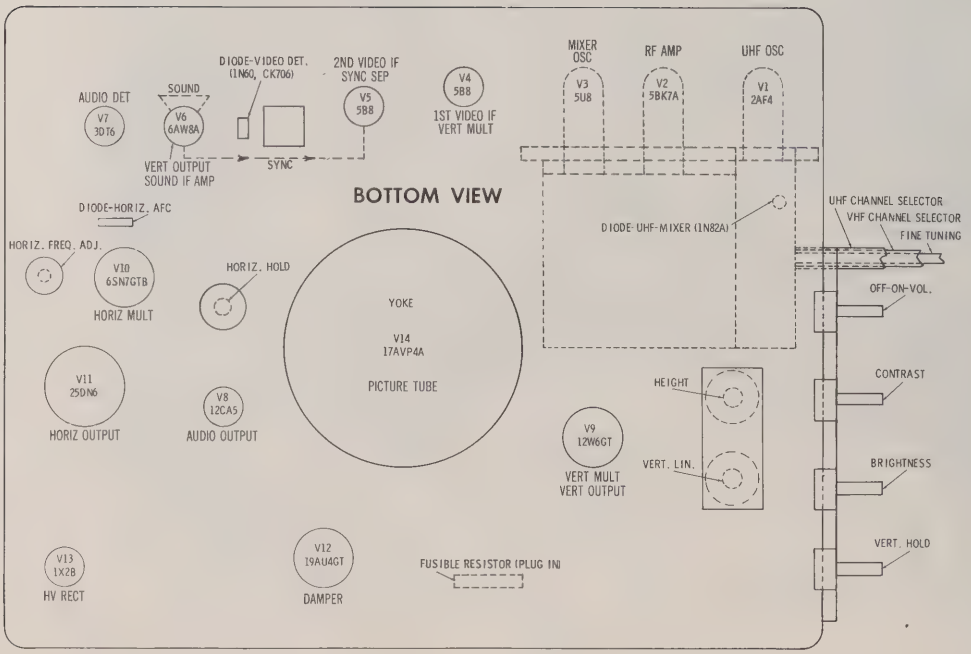



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

# RESISTANCE MEASUREMENTS

| ITEM | TUBE | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 | Pin 8 | Pin 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| V1 | 2AF4 | † 4600Ω | 6800Ω | 11.5Ω | 12Ω | .1Ω | 6800Ω | † 4600Ω | | |
| V2 | 5BK7A | † 320Ω | 1Meg | .1Ω | 10.5Ω | 11.5Ω | † 320Ω | 1Meg | 0Ω | 0Ω |
| V3 | 5U8 | † 3600Ω | 470K | † 120K | 10.5Ω | 9Ω | † 1300Ω | 0Ω | 0Ω | 15K |
| V4 | 5B8 | 0Ω | • 1.2Meg | • † 2.2Meg | 8Ω | 9Ω | 1Meg | 56Ω | † 170Ω | † 170Ω |
| V5 | 5B8 | 0Ω | 2.2Meg | † 9000Ω | 7Ω | 8Ω | .1Ω | 180Ω | † 170Ω | † 170Ω |
| V6 | 6AW8A | 0Ω | 100K | † 35K | 4.5Ω | 7Ω | • 190Ω | 1.5Meg | † 22Ω | † 3300Ω |
| V7 | 3DT6 | 4.2Ω | 680Ω | 4.5Ω | 3.5Ω | ‡700K | † 2200Ω | 680K | | |
| V8 | 12CA5 | 120Ω | 0Ω | 17Ω | 14.5Ω | 0Ω | † 22Ω | † 435Ω | | |
| V9 | 12W6 | TP | 12Ω | † 260Ω | † 22Ω | • 2.3Meg | TP | 14.5Ω | 0Ω | |
| V10 | 6SN7GTB | 2.4Meg | † 12K | 1200Ω | • 85K | † 47K | 1200Ω | 1.5Ω | 3.5Ω | |
| V11 | 25DN6 | TP | 22Ω | 0Ω | TP | 400K | TP | 17Ω | † 1200Ω | TOP CAP ‡ 12Ω |
| V12 | 19AU4GT | NC | TP | ¶ | NC | † 22Ω | NC | 25Ω | 22Ω | |
| V13 | 1X2B | | PINS | 1 THRU 9 | HAVE | INFINITE | RESISTANCE | | | TOP CAP ‡460Ω |
| V14 | 17AVP4A | 0Ω | 11Ω | PIN 6 ‡27K | PIN 10 ‡27K | PIN 11 • 600K | PIN 12 1.5Ω | | | |

† MEASURED FROM 130V SOURCE.
‡ MEASURED FROM PIN 3 OF V12.
■ THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.
¶ THIS READING CAN VARY GREATLY, (10K MINIMUM), DUE TO THE CONDITION OF THE ELECTROLYTIC CAPACITOR CONNECTED IN THE ASSOCIATED CIRCUIT.
NC NO CONNECTION
TP TIE POINT




# TUBE PLACEMENT CHART

# ALTERNATE TUNER SCHEMATIC




A PHOTOFACT STANDARD NOTATION SCHEMATIC
Howard W. Sams & Co., Inc. 1958

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OF THE
RADIO MUSEUM

# PARTS LIST AND DESCRIPTIONS

## TUBES ( GENERAL ELECTRIC, SYLVANIA)

| ITEM No | USE | TYPE | NOTES |
|---|---|---|---|
| V1 | UHF Oscillator | 2AF4 | |
| V2 | RF Amplifier | 2BK7A | |
| V3 | Mixer-Oscillator | 5L8 | |
| V4 | 1st Video IF Amp - Vert. Mult. | 5B8 | |
| V5 | 2nd Video IF Amp - Sync. Separator | 5B8 | |
| V6 | Video Output-Sound IF Amp | 6AW8A | |
| V7 | Audio Detector | 3DT6 | |
| V8 | Audio Output | 12CA5 | |
| V9 | Vert. Mult. -Vert. Output | 12W6 | |
| V10 | Horiz. Mult. | 6BW7B | |
| V11 | Horiz. Output | 16DN6 | |
| V12 | Damper | 18AU4GT | |
| V13 | HV Rectifier | 1X2B | |

## PICTURE TUBE

| ITEM No | REPLACEMENT DATA | | | NOTES |
|---|---|---|---|---|
| | Hallicrafters PART No. | GENERAL ELECTRIC PART No. | SYLVANIA PART No. | |
| V14 | 17AVP4A | 17AVP4A<br>17ATP4A ① | 17AT14A<br>17AVP4A ② ③<br>17ATP4<br>17AVP4 | ① Aluminized<br>② Silver screen 85 |

## ELECTROLYTIC CAPACITORS

| ITEM No | RATING | | REPLACEMENT DATA | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | CAP | VOLT | Hallicrafters PART No. | AEROVOX PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | PYRAMID PART No. | SANGAMO PART No. | SPRAGUE PART No. |
| C3A | 200 | 150 | 45A9R ① | PR3-012 | XCO129 | WT320 | CDB-T-3015 | D-045<br>MT-1512 | H2294 * |
| B | 350 | 150 | | | | | | | |
| C | 10 | 150 | | | | | | | |

① Some versions may use Part #45C38 in this application.
* Non-catalog item.

## FIXED CAPACITORS

**Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.**

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| | CAP | VOLT | Hallicrafters PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | ERIE PART No. | MALLORY PART No. | SPRAGUE PART No. | |
| C2 | 22 | | | | | | | | | N150 |
| C3 | 47 | | | | | | | | | |
| C4 | 47 | | | | | | | | | |
| C5 | 1000 | | | EF-001 | MFT-1000 | | | | 503C-DI | |
| C6 | | | | | | | | | | |
| C7 | 1000 | | | EF-001 | MFT-1000 | | | | 503C-DI | |
| C8 | 1000 | | | EF-001 | MFT-1000 | | | | 503C-DI | |
| C9 | 18 | | | | | | | | | |
| C10 | 11 8 | | | | | | | | | |
| C11 | 1 5 | | | | | | | | | N150 |
| C12 | 470 | | | BPD-00047 | DD-470 | BYA10T47 | ED-470 | UC-5347 | SGA-T47 | |
| C13 | 10 | | | SI-10 | DE-100 | LT6Q | GP-10 | UC-541 | SGA-Q1 | |
| C14 | 18 | | | | | | | | | |
| C15 | 2.7 | | | | | | | | | |
| C16 | 1000 | | | EF-001 | MFT-1000 | | | | 503C-DI | |
| C17 | 1000 | | | EF-001 | MFT-1000 | | | | 503C-DI | |
| C18 | 15 | | | BPD-000015 | DD-150 | L10Q15 | ED-15 | UC-5415 | SGA-Q15 | |
| C19 | 15 | | | BPD-000015 | DD-150 | L10Q15 | ED-15 | UC-5415 | SGA-Q15 | |
| C20 | 1 2 | | | | | | | | | |
| C21 | 1000 | | | EF-001 | MFT-1000 | | | | 503C-DI | |
| C22 | 10 | | | BPD-00001 | DD-100 | L10Q1 | ED-10 | UC-541 | SGA-Q1 | |
| C23 | 1 5 | | | NPO-SI 1 5 | TCZ-1R5 | C10V15C | TCO-1 5 | ZT-5515 | STCCB-V15 | |
| C24 | 1000 | | | EF-001 | MFT-1000 | | | | 503C-DI | |
| C25 | 8i | | | | | | | | | |
| C26 | 1000 | | | EF-001 | MFT-1000 | | | | 503C-DI | |
| C27 | 1000 | | | BPD-001 | DD-102 | BYA5D1 | ED-1000 | DC521 | SHK-DI | |
| C28 | 1000 | | | BPD-001 | DD-102 | BYA5I2 | FD-1000 | DC521 | SHK-DI | |
| C29 | 1000 | | | EF-001 | MFT-1000 | | | | 503C-DI | |
| C30 | 1000 | | | EF-001 | MFT-1000 | | | | 503C-DI | |
| C31 | 1000 | | | EF-001 | MFT-1000 | | | | 503C-DI | |
| C32 | 1000 | | | EF-001 | MFT-1000 | | | | 503C-DI | |
| C33 | 1000 | | | BPD-001 | DD-102 | BYA6D1 | ED-1000 | DC521 | SHK-DI | |
| C34 | 1000 | | 47A220 | BPD-001 | DD-102 | BYA5D1 | ED-1000 | DC521 | SHK-DI | |
| C35 | 25 | 200 | 46A7254J | P288N-25 | | CUB2P25 | | GEM-2025 | STM-P25 | 10% |
| C36 | 330 | | 47A640 | | D6-331 | L10T33 | ED-330 | | | |
| C37 | 1000 | | 47A220 | BPD-001 | DD-102 | BYA6D1 | ED-1000 | DC521 | SHK-DI | |
| C38 | 560 | | 47-642 | | BYA10T56 | ED-560 | UC-5356 | SGA-T56 | | |
| C39 | 4.7 | | 47B403-S | NPO-SI 4.7 | TCZ-4R7 | C10V4TC | TCO-4.7 | ZT-5547 | STCCB-V4 | 10% |
| C40 | 10 | | 47A20A100K | NPO-SI 10 | TCZ-10 | C10Q1C | ED-10 | ZT-514 | STCC-Q1 | 10% |
| C41 | .047 | 200 | 46D818473M2 | | | | | | | 10% |
| C42 | 68 | | 47-635 | | | | | | | |
| C43 | .1 | 200 | 46A104J | P288N-1 | DF-104 | CUB2P1 | | GEM-301 | STM-P1 | |
| C44 | .25 | 600 | | | | | | | | |
| C45 | 10 | | | SI 10 | D6-100 | LT6Q1 | GP-10 | UC-541 | SGA-Q1 | |
| C46 | 22 | | | | | | | | | NOT5 |
| C47 | 47 | | 47CA30A470M | SI 47 | D6-471 | LT6Q47 | GP-47 | UC-5447 | SGA-Q47 | |
| C48 | 3.0 | | 47A307 | NPO-SI 3.0 | | C10V3C | TCO-3 0 | ZT-5533 | | 5% |
| C49 | 10000 | | 47A224 | BPD-01 | DD-103 | BYA6I | ED-01 | DC511 | SHK-SI | |
| C50 | 10000 | | 47A224 | BPD-01 | DD-103 | BYA6I | ED-01 | DC511 | SHK-SI | |
| C51 | 1000 | | 47A220 | BPD-001 | DD-102 | BYA6D1 | ED-1000 | DC521 | SHK-DI | |
| C52 | 15 | | 47B460 | | | CUB4P15 | | GEM-415 | STM-P15 | N080 |
| C53 | .56 | 300 | 46A056J | P288N-05 | DF-S03 | CUB4S5 | | GEM-415 | STM-S5 | |
| C54 | 3.0 | | 47A307 | NPO-SI 3 0 | | C10V3C | TCO-3.0 | ZT-5533 | | 5% Note 1 |
| C55 | 10000 | | 47A224 | BPD-01 | DD-103 | BYA6I | ED-01 | DC511 | SHK-SI | |
| C56 | 10000 | | 47A224 | BPD-01 | DD-103 | BYA6I | ED-01 | DC511 | SHK-SI | |
| C57 | 820 | | 47-606 | | DD-821 | L10T82 | ED-820 | | SGA-T82 | |
| C58 | 2000 | | 47A393 | BPD-002 | DD-202 | BYA10D2 | ED-2000 | DC522 | SHK-D2 | |
| C59 | .0039 | 400 | 46BR392E4 | | | | | | | 10% |
| C60 | 1000 | | 47-502 | BPD-001 | DD-103 | BYA6I | ED-1000 | DC511 | SHK-DI | |
| C61 | .047 | 400 | 46AW473E | | | | | | | 10% |
| C62 | .047 | 400 | 46AW473E | | | | | | | 10% |
| C63 | 10000 | 1000 | 47-606 | | | BYA10S1 | | | | |
| C64 | 100 | | 47CA30A101M | SI 100 | D6-101 | LT6T1 | GP-100 | UC-531 | SGA-T1 | |
| C65 | 47 | | 47CA30A470M | SI 47 | D6-470 | LT6Q47 | GP-47 | UC-5447 | SGA-Q47 | |
| C66 | 1000 | | 47A5R6 | | | | ED-1000 | | | 10% |
| C67 | 1000 | | 47A586 | | | | ED-1000 | | | 10% |
| C68 | .1 | 350 | 46A104J | P288N-1 | DF-104 | CUB2P1 | | GEM-301 | STM-P1 | |
| C69 | .0056 | 400 | 46AU562E4 | | | | | | | 10% |
| C70 | 330 | | 47X20D331K | 1469-00033 | | 5RST33 | | | MS-333 | 10% |
| C71 | 680 | | 47X20D681K | 1464-00068 | | 1RST68 | | | MS-368 | 10% |
| C72 | 470 | | | BPD-00047 | DD-471 | BYA10T47 | ED-470 | UC-5347 | SGA-T47 | |
| C73 | .005 | 300 | 46AU502E | | | | | | | 10% |
| C74 | 1. | 200 | 46A243 | | | | | | | |
| C75 | .15 | 600 | 46BR224L6 | P588N-15 | | CUB6P15 | | GEM-6015 | STM-P15 | |
| C76 | 100 | 3000 | 47-570 | HVBD-30-100 | DD30-101 | HVB30T1 | HD3-100 | 30CA-T1 | | |
| C77 | 56 | 3000 | 47A537 | | | | | | | 10% |
| C78 | 10000 | | 47A224 | BPD-01 | DD-103 | BYA6I | ED-01 | DC511 | SHK-SI | |



## CAPACITORS (cont)

| ITEM No | RATING | | REPLACEMENT DATA | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | CAP | VOLT | Hallicrafters PART No | AEROVOX PART No | CENTRALAB PART No | CORNELL-DUBILIER PART No | ERIE PART No | MALLORY PART No | SPRAGUE PART No | |
| C79 | 1000 | | 47A220 | BPD-001 | DD-102 | BYA6D1 | 5D-1000 | DC521 | SHK-DI | |
| C80 | .33 | 600 | | P688N-33 | | CUB6P33 | | GEM-6022 | STM-P33 | |
| C81 | 1 | 200 | 46AU104J | P288N-1 | DF-104 | CUB2P1 | | GEM-301 | STM-P1 | |
| C82 | .35 | 300 | 46AX354J | P288N-35 | | CUB2P35 | | GEM-3035 | STM-P35 | |

Note 1. Some versions may use a 1000mmf (Part #47A230) in this application.

## CONTROLS

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|
| | RESISTANCE | WATTS | Hallicrafters PART No | CENTRALAB PART No. | CLAROSTAT PART No. | IRC PART No. | MALLORY PART No. | |
| R1A | 330K | ½ | 38B1101 | AB-80 | A47-500K-S | Q33-122 | TA334A | Volume |
| B | Shaft | | | AK-7 | FS-3 | Not Req. | Not Req. | |
| C | Switch | | | KB-1 | SWS-12 | 76-1 | US-26 | |
| R2A | 15000 | ½ | 38B1103 | AB-515 | | Q7-109 | US | Contrast |
| B | Shaft | | | AK-7 | | Not Req. | Not Req. | |
| R3 | 5Meg | ½ | 38B1254 | | | Q7-141 | TA56R | Brightness |
| R4A | 1.5Meg | - | 25B1254 | AB-742 | A47-1.5Meg-S | Q1-136 | TA151L | Vert. Hold |
| B | Shaft | | | AK-7 | FS-3 | Not Req. | Not Req. | |
| R5A | 5Meg | ½ | 38B1368 | AB-485 * | A47-4Meg-S* | Q11-146 * | | Height with 1Meg stop |
| B | Shaft | | | AK-19 | RN-3 | TM3-K11 | | |
| C | 3Meg | ½ | | AB-76 | A47-3Meg-S | B11-139 | | Vert. Lin. |
| D | Shaft | | | AK-19 | RN-3 | TM3-K11 | | |
| R6A | 75K | ½ | 38B1305 | AB-35 | A47-75K-S | B11-125 | PTA15L | Horiz. Hold |
| B | Shaft | | | AK-4 | MS6-3 | TM3-K11 | Not Req. | |

* Use 1 Meg resistor in series with the right hand terminal.

## RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

| ITEM No | RATING | | Hallicrafters PART No | NOTES |
|---|---|---|---|---|
| | OHMS | WATT | | |
| R7 | 6800Ω | | 23X20X682K | |
| R8 | 1000Ω | | 23X20X102K | |
| R9 | 510Ω | | 23X20X51SK | |
| R10 | 220K | | 23X20X224K | |
| R11 | 4700Ω | | 23X20X472K | |
| R12 | 8000Ω | | 23X20X82K | Note 1 |
| R13 | 470K | | 23X20X474K | |
| R14 | 6800Ω | | 23X20X682K | |
| R15 | 120K | | 23X20M24K | |
| R16 | 150K | | 23X20X154K | |
| R17 | 3300Ω | 1 | 23X20X332K | Note 2 |
| R18 | 1000Ω | | 23X20X102K | |
| R19 | 100Ω | | 23X20X101K | |
| R20 | 15K | | 23X20X153K | |
| R21 | 220Ω | | 23X20X221K | |
| R22 | 1Meg | | 23X20X105K | |
| R23 | 10K | | 23X20X103K | |
| R24 | 150Ω | | 23X20X151K | |
| R25 | 56Ω | | 23X20X560K | |
| R26 | 150Ω | | 23X20X151K | |
| R27 | 180Ω | | 23X20X181K | |
| R28 | 6800Ω | | 23X20X682K | |
| R29 | 2.7Meg | | 23X20X275K | |
| R30 | 3.3Meg | | 23X20X335K | |
| R31 | 33000 | 7 | 24-1125 | |
| R32 | 27K | | 23X20X273K | |
| R33 | 120K | | 23X20X124K | |
| R34 | 100K | | 23X20X104K | |
| R35 | 33K | | 23X20X333K | |
| R36 | 680K | | 23X20X684K | |
| R37 | 270K | | 23X20X274K | |
| R38 | 680K | | 23X20X684K | |
| R39 | 2200Ω | | 23X20X222K | |
| R40 | 680Ω | | 23X20X681K | |
| R41 | 120Ω | | 23X20X121K | |
| R42 | 27K | 1 | 23X20X273K | |
| R43 | 15K | | 23X20X153K | |
| R44 | 13K | 1 | 23X20X133K | |
| R45 | 68K | | 23X20X683K | |
| R46 | 6800Ω | | 23X20X682K | |
| R47 | 12K | | 23X20X123K | |
| R48 | 100K | | 23X20X104K | |
| R49 | 100K | | 23X20X104K | |
| R50 | 100K | | 23X20X104K | |
| R51 | 100K | | 23X20X104K | |
| R52 | 470K | | 23X20X474K | |
| R53 | 180K | | 23X20X184K | |
| R54 | 1.5Meg | | 23X20X155K | |
| R55 | 680Ω | | 23X20X681K | |
| R56 | 180Ω | | | Note 3 |
| R57 | 220K | | 23X20X224K | |
| R58 | 1Meg | | 23X20X105K | |
| R59 | 470Ω | | 23X20X472K | |
| R60 | 1Meg | | 23X20X105K | |
| R61 | 1Meg | | 23X20X105K | |
| R62 | 82K | | 23X20X823K | |
| R63 | 12K | | 23X20X123K | |
| R64 | 68K | | 23X20X683K | |
| R65 | 47K | | 23X20X473K | |
| R66 | 390K | | 23X20X394K | |
| R67 | 33000 | | 23X20X332K | |
| R68 | 1200Ω 5% | | 23X20X122J | |
| R69 | 390K | | 23X20X394K | |
| R70 | 47K | | 23X20X473K | |
| R71 | 1200Ω | 1 | 23X20X122K | |
| R72 | 6800Ω | | 23X20X682K | |
| R73 | 150Ω | | 23X20X151K | |
| R74 | 4.7Ω | 5 | 24-1116 | |
| R75 | 18Ω | 7 | 24-1109 | |

Note 1. Some versions may use 8200Ω in this application.
Note 2. Some versions may use 3900Ω in this application.
Note 3. Some versions may use 220Ω in this application.

## TRANSFORMERS (SWEEP CIRCUITS)

| ITEM No | USE | REPLACEMENT DATA | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|
| | | Hallicrafters PART No | Hallodrom PART No | Merit PART No | Ram PART No | Stancor PART No | Thordarson PART No | Triad PART No |
| T1 | Vert. Output | 55A303 | Z1906 ① | A-2822 ② | | | 26S71 | A-108X ② |
| T2A | Vert. Output<br>Yoke-Horiz (25MH) | 55A303<br>53C396 | | DF-807 ③ | MDF-82 ③ | Y90F19/43 ③ | DY-16A ③ | Y-16 ③ | Y-41 ③ |
| B | (90°) Vert (45MH)<br>Ait. Yoke | 53-396 | | | | | | |
| | Yoke Rear Cover | 8-3223 | | | | | | |
| M8 | Centering Device | 81B2E | | | | | | |
| T3 | Horiz. Output | 98-301 | | HVO-134 | X154 | | | |
| | Ait. Horiz. Output | 55C301 | | HVO-134 | X154 | | | |

① Use 6 to 1 turn ratio.
② Drill new mounting hole(s).
③ Use original rear cover and centering device and original yoke damping network, if necessary.

## TRANSFORMER (AUDIO OUTPUT)

| ITEM No | IMPEDANCE | | REPLACEMENT DATA | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | | | Hallicrafters PART No | Hallodrom PART No | Merit PART No | Stancor PART No | Thordarson PART No | Triad PART No | |
| | PRI | SEC | | | | | | | |
| T4 | 4500Ω | 3-4Ω | 55C302 | Z1107 ① | A-3026 | A-3328 | 24S48 | S-5X | ① Drill one new mounting hole |

## SPEAKER

| ITEM No | TYPE | | | REPLACEMENT DATA | | NOTES |
|---|---|---|---|---|---|---|
| | SIZE | FIELD | V C IMP | Hallicrafters PART No. | QUAM PART No. | |
| SP1 | 4" | PM | 3-4Ω | 85C178 | 4A07 | |

## COILS (RF-IF)

| ITEM No. | USE | REPLACEMENT DATA | | | | NOTES |
|---|---|---|---|---|---|---|
| | | Hallicrafters PART No. | MEISSNER PART No. | MERIT PART No | MILLER PART No | |
| L1 | 1st. Video IF | 51-2107 | 17-4534 | TV-131 | 6325 | |
| L2 | 2nd. Video IF | 51-2158 | | | | |
| L3 | 3rd. Video IF | 50-688 | | | | |
| L4 | RF Choke | 53A307 | 19-1008 | | 4634 | 18 Microhenries |
| L5 | Shunt Peaking Coil | 51-2108 | | TV-307 | 6356 | 805 Microhenries |
| L6A | 4.5MC Trap | 51B1996 | | TV-120 | | |
| B | 1st. Sound IF | | | | | |
| L7 | Shunt Peaking Coil | 51-2101 | 19-4400 ▲ | | 5134 ▲ | 395 Microhenries, wound on 3900Ω resistor |
| L8 | Series Peaking Coil | 51A1084 | 19-2100 * | TV-196 * | 6130 * | 180 Microhenries, wound on 27K resistor |
| L9 | 2nd. Sound IF | 51-2168 | | | | |
| L10 | Quadrature Coil | 51A1057 | 20-1005 | TV-121 | 1480 | |
| L11 | RF Choke | 53-342 | | | 4611 | 7.5 Microhenries (RC part #CLA - Note 1 |

Note 1. Not used in some versions
▲ Parallel 3900Ω resistor.
* Parallel 27K resistor

## TRANSFORMER (HORIZ. OSC.)

| ITEM No. | DC RES. | | REPLACEMENT DATA | | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| | PRI | SEC | Hallicrafters PART No | MEISSNER PART No | MERIT PART No | MILLER PART No | RCA TYPE No. | Ram PART No. | Thordarson PART No. | |
| L12 | 22Ω | | 51-2160 | 19-1575 | MWC-12 | 9210 * | | | HS-4 | |

* Enlarge mounting hole

## FILTER CHOKE

| ITEM No | RATINGS | | | REPLACEMENT DATA | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| | TOTAL DIRECT CURRENT | D C RESISTANCE | INDUCTANCE (0 CURRENT 1000 ᵐA) | Hallicrafters PART No. | Hallodrom PART No. | Merit PART No. | Stancor PART No. | Thordarson PART No. | Triad PART No. | |
| L13 | 240A | 23Ω | .6 HY. | 56A250 | | | | | C-27X | |

## COMPONENT COMBINATIONS

| ITEM No | USE | DESCRIPTION | Hallicrafters PART No | REPLACEMENT DATA |
|---|---|---|---|---|
| K1 | Ant Isolation | 470MMF, 3-1Meg | 49-072 ↓ | Centralab RC-471 |
| K2 | Ant Isolation | 470MMF, 3-1Meg | 49-072 ↓ | Centralab RC-471 |
| K3 | Sync Coupiate | 270MMF, 10000MMF, 25MMF, 330K, 2 2Meg | 49A046 | Arrovox PA-533<br>Centralab PC-283<br>Sprague ST-3 |

↓ Used in UHF-VHF models only

## RECTIFIERS

| ITEM No | RATING | REPLACEMENT DATA | | | | | NOTES |
|---|---|---|---|---|---|---|---|
| | CURRENT (Measured) | Hallicrafters PART No | FEDERAL PART No | GENERAL ELECTRIC PART No | INTERNATIONAL PART No | SARKES TARZIAN PART No. | |
| M1 | .300A | 27C238 ↓<br>27C226 ↓ | 1032A ↓<br>1215 ↓ ③ | 1N1007 ↓ | RS330SL ↓<br>1T1 ↓ ③ | 350 ↓ | ↓ Selenium type<br>② Germanium type<br>③ Two required. |
| M2 | | | | | | | |

## CRYSTAL DIODES

| ITEM No. | ORIG. TYPE | REPLACEMENT DATA | | | NOTES |
|---|---|---|---|---|---|
| | | Hallicrafters PART No. | CBS PART No. | SYLVANIA PART No. | |
| M3 | D660 | | 1N82A | 1N82A | UHF Mixer (Clip-in) |
| M4 | 1N60 * | 19C1864 | 1N60 | 1N60 | Video Det. (Pigtail) |

* A CK-706A may be used in some versions

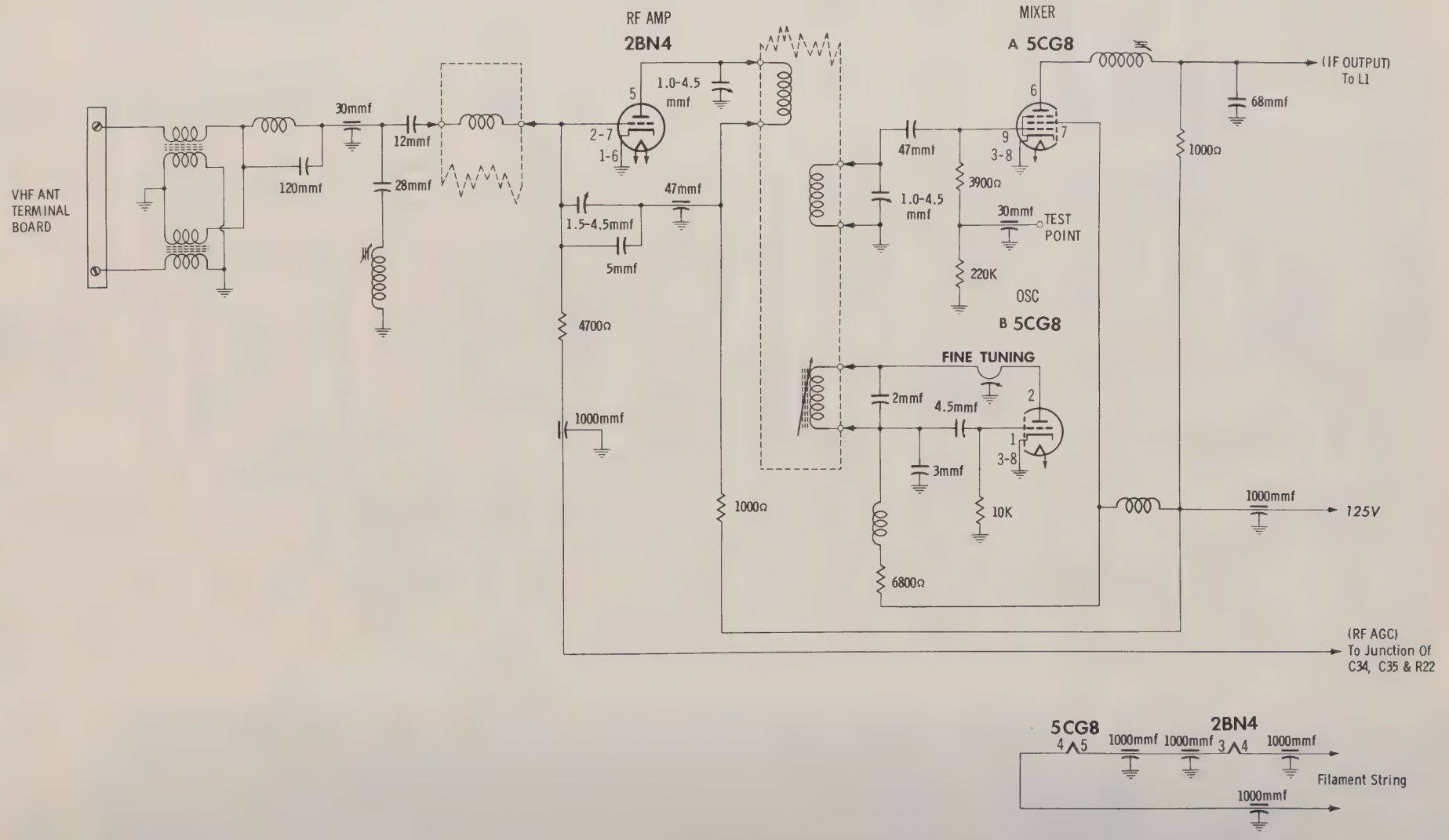
## MISCELLANEOUS

| ITEM No. | PART NAME | Hallicrafters PART No. | NOTES |
|---|---|---|---|
| M5 | Tuner | 1-3051 | |
| | Tuner | 1-3067 | Chassis A2007 |
| | Tuner | 1-3052 | Chassis E3007 |
| | Tuner | 1-323 | Chassis E2007 |
| M6 | Centering Device | 21B216 | |
| M7 | Ion Trap | 21B188 | |

## CABINETS & CABINET PARTS

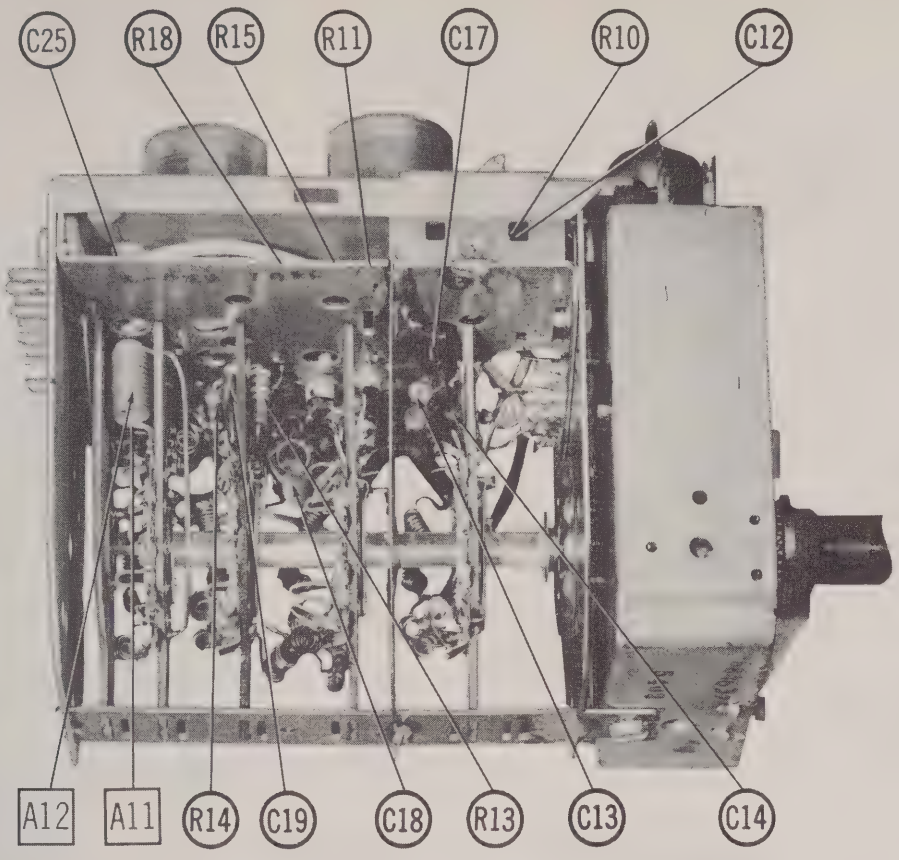
**(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)**

| NAME | PART NO. | DESCRIPTION |
|---|---|---|
| Safety Glass | 22C423 | |
| Mask | 7A835 | |
| Knob | 15-847 | Channel Selector - Models 17TS760BJX, 17TS740B |
| Knob | 17A788 | Control- Models 17TS760BJX, 17TS740B |
| Knob | 15-781 | Channel Selector - Model 17TS740M |
| Knob | 15C775 | Control - Model 17TS740M |
| Knob | 15D762 | Fine Tuning |
| Handle | 30-408 | Model 17TS740M |
| Handle | 30-378 | Model 17TS740B |
| Cabinet | 78-1947 | Model 17TS760BJX |
| Cabinet | 78-1948 | Model 17TS740B |
| Cabinet | 78-1949 | Model 17TS740M |

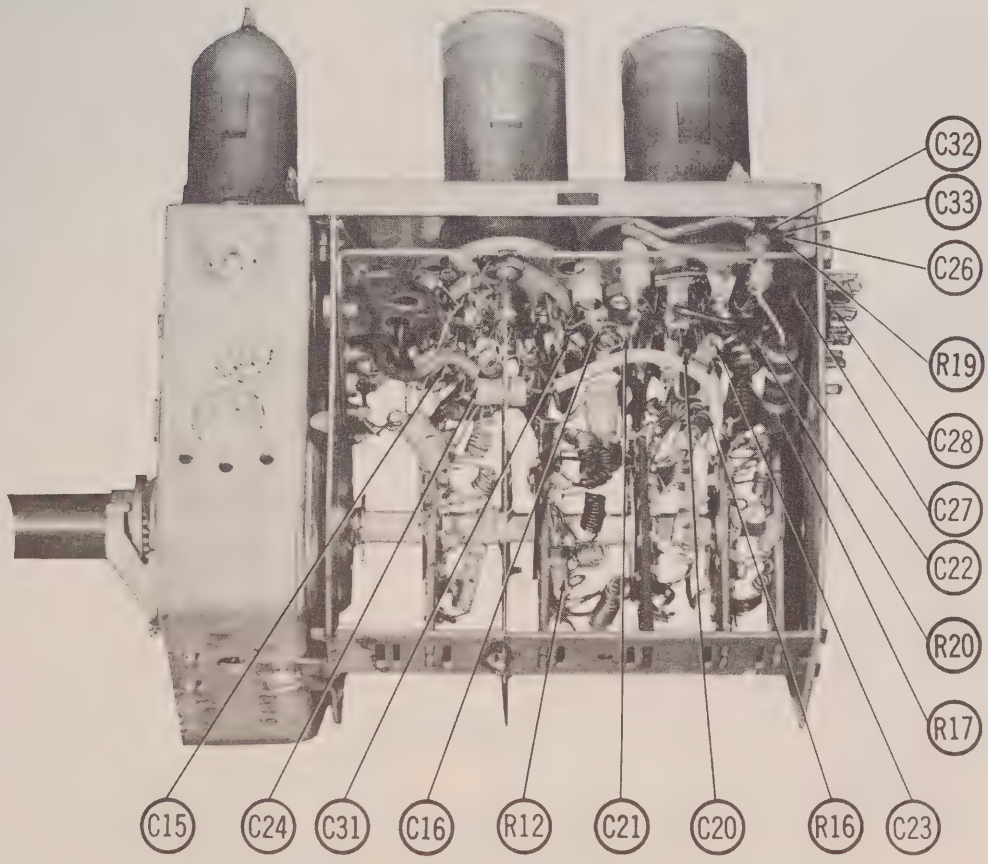



VHF Tuner Part #1D3052, 1D3213

## ALTERNATE TUNER SCHEMATIC

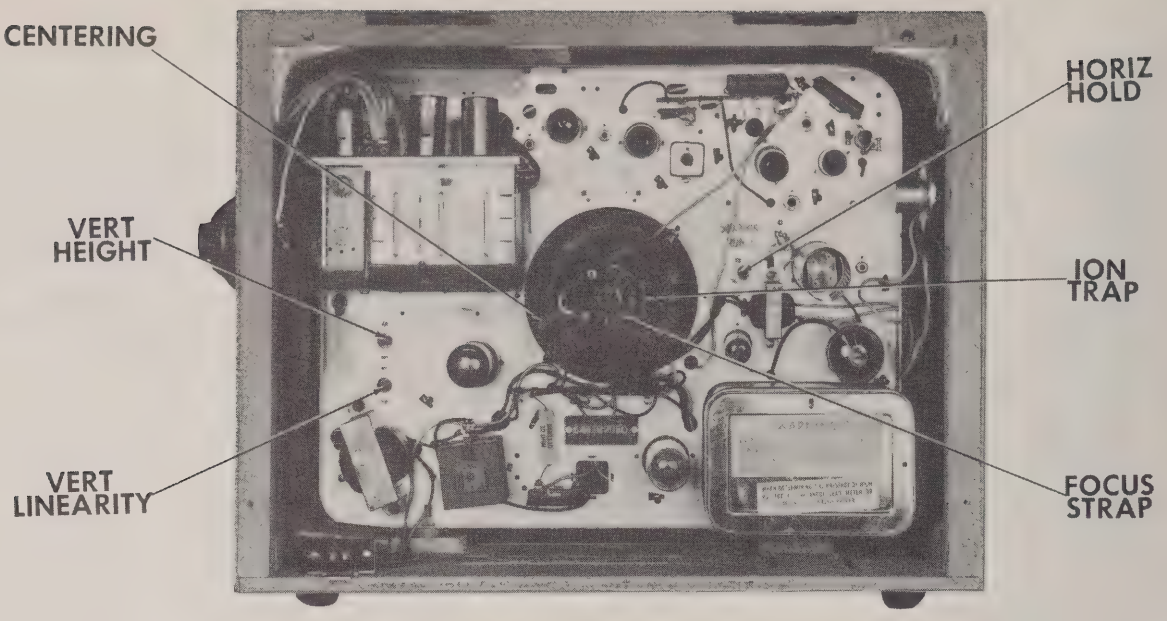



RF TUNER-LEFT SIDE




RF TUNER-RIGHT SIDE

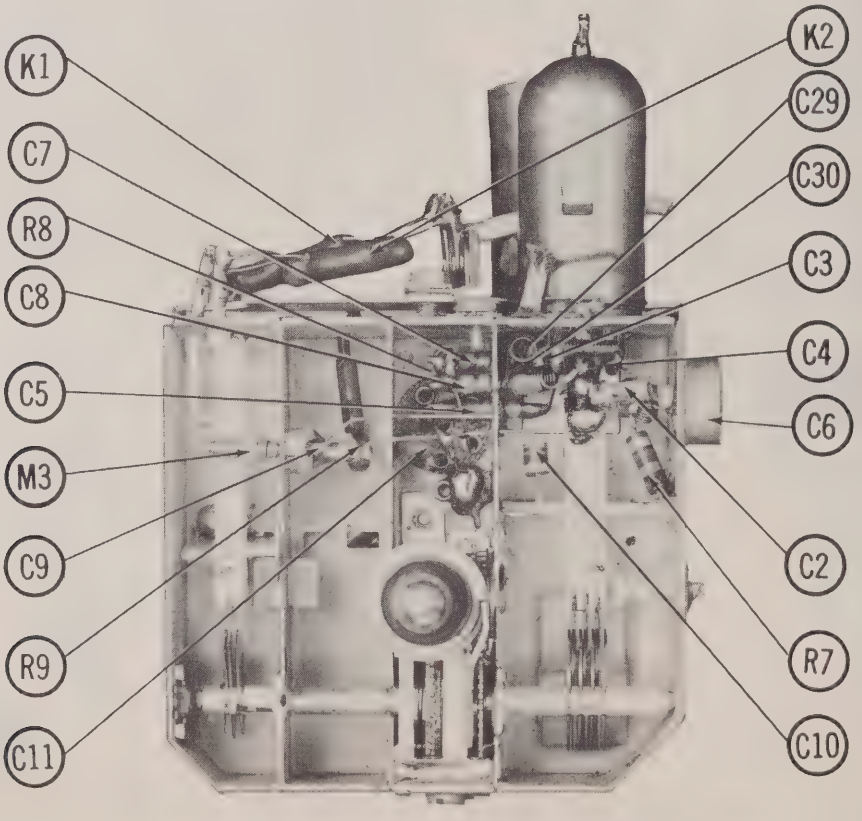
FOLDER 2




## CABINET—REAR VIEW

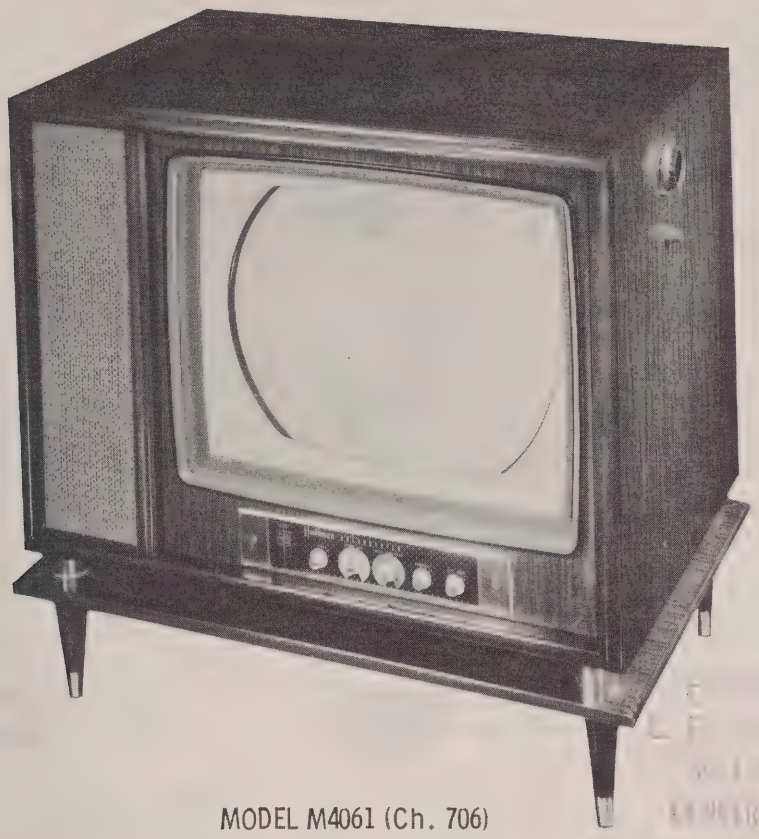
## HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

| | |
|---|---|
| Turn the set on and tune in a TV station, preferably with a test pattern. Set the horizontal hold control at the center of its range. | Adjust the horizontal frequency slug (B1) until the picture synchronizes horizontally. |




RF TUNER FRONT VIEW

PHOTOFACT* Folder



MODEL M4061 (Ch. 706)

# HOFFMAN MODELS B2021, U, B4061, U, M2021, U, M4041, U, M4061, U, SP2021, U, SP4041, U, SP4061, U (Ch. 706, U)

| | | | |
|---|---|---|---|
| TRADE NAME | Hoffman | MODELS | CHASSIS |
| | | B2021, B4041, B4061, M2021, M4041, M4061, SP2021, SP4041, SP4061 | 706 |
| | | B2021U, B4041U, B4061U, M2021U, M4041U, M4061U, SP2021U, SP4041U, SP4061U | 706U |
| MANUFACTURER | Hoffman Radio Corp., 6200 S. Avalon Blvd., Los Angeles 3, Calif. | | |
| TYPE SET | Color Television Receiver | | |
| TUBES | Thirty | | |
| POWER SUPPLY | 110-120 Volts AC, 60 Cycle RATING 400 Watts, 3.9 Amp. @ 117 Volts AC | | |
| TUNING RANGE | Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier) | | |

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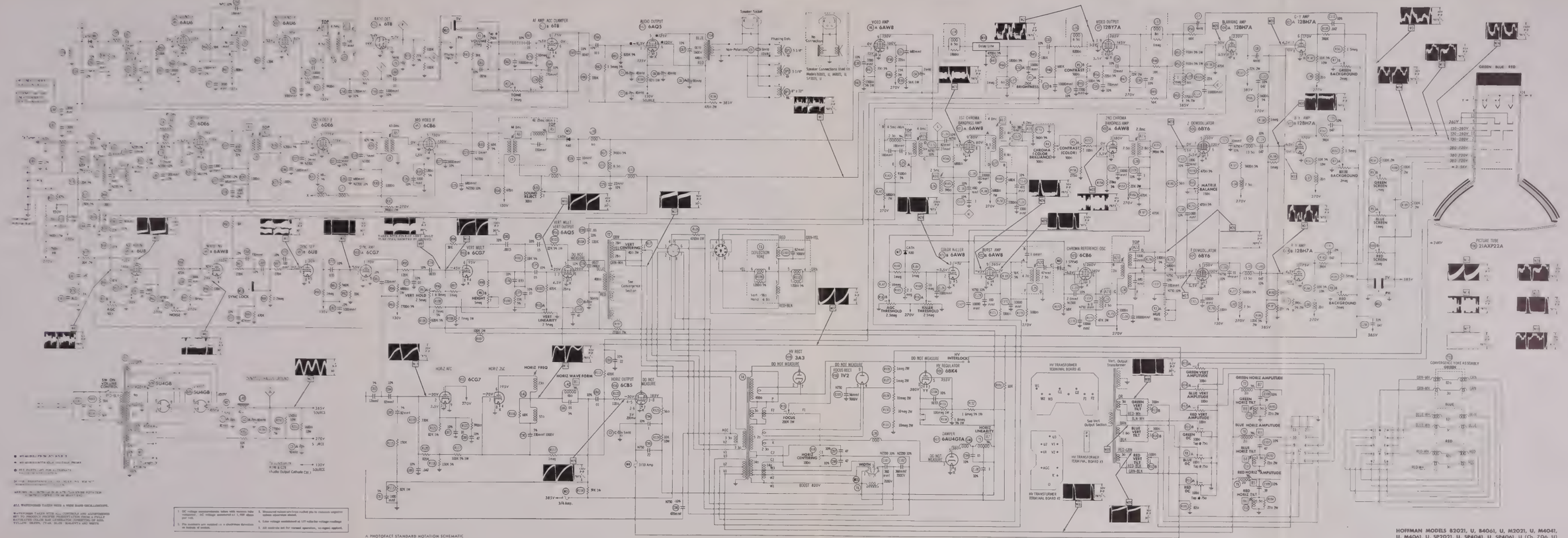


HOFFMAN MODELS 82021, U, 84061, U, M2021, U, M4041, U, M4061, U, SP2021, U, SP4041, U, SP4061, U (Ch. 706, U)

# BLOCK DIAGRAM

# MISCELLANEOUS ADJUSTMENTS

## HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Connect a 0-500MA meter across the horizontal output tube fuse holder (M4). Remove the fuse (M4).
Loosen the cover of the high voltage cage and slide back. Remove if necessary. Connect the VTVM thru the high voltage probe to the high voltage rectifier base ring. Connect the common lead to chassis.
Turn the set on and tune in a TV station.
Set the width switch (M11) on the rear of the high voltage cage to its center position.
If necessary, adjust the vertical hold control to synchronize the picture vertically. Adjust the horizontal hold to synchronize the picture horizontally.
Using a low capacity probe, connect the vertical amplifier of the scope to terminal "J" of the horizontal oscillator printed board. Connect the low side to chassis. Adjust the horizontal waveform slug (B1) until the sharp peaks and the round peaks of the waveform on the scope are of equal amplitude as in Fig. 8; keep the picture in sync during this adjustment with the horizontal hold.
Rotation of the horizontal hold should cause the picture to lose sync at either end of its rotation. From counter clockwise position, the picture should pull into sync with between 1 and 3 bars present. The picture should remain in sync for three complete turns of the horizontal hold clockwise from the pull-in position.
The correct setting of the horizontal hold is one full turn counter clockwise from the point of pull-in at the clockwise position of the knob. Adjust horizontal linearity slug (B2) for MINIMUM current reading on the MA meter. This will give the best horizontal linearity. Adjust the height and vertical linearity controls for a 5/8" over scan, at the top and bottom of the screen, with a 117 volt line voltage. Adjust the focus control (R19) for proper focus.
Check the high voltage regulator by inserting a 0-1000 microammeter in place of the test jumper in series with the cathode of the 6BK4 (V20). With a 20KV reading on the high voltage anode, a current reading of 800 microamps should be obtained. This indicates a beam power of 16 watts. (20,000 x .0008 = 16). If the calculation of the beam power shows less than 16 watts, adjust the horizontal linearity slug (B2) to increase the beam power.
CAUTION: DO NOT adjust B2 to produce more than 220MA of current on the milliammeter connected across the fuse (M4).

## PRELIMINARY CONVERGENCE ADJUSTMENTS

Connect the RF output of a dot generator to the antenna terminals.

| STEP | ADJUST | REMARKS |
|---|---|---|
| 1. | Red, blue and green horizontal and vertical amplitude controls. | Turn fully counter clockwise. |
| 2. | Red, blue and green vertical tilt controls. | Set to mid-range. |
| 3. | Check for correct position of convergence coil assembly, purity magnet and blue lateral magnet on neck of picture tube. | |
| 4. | Red, blue and green DC controls and blue lateral magnet. | Adjust for white dot at center of screen. |

## PURITY ADJUSTMENTS

Switch channel selector to an unused channel. The front cabinet trim must be removed to adjust the equalizing magnets.

| STEP | ADJUST | REMARKS |
|---|---|---|
| 1. | Equalizing magnets (6). | Turn fully counter clockwise. |
| 2. | Contrast control | Fully counter clockwise. |
| 3. | Brightness control | Fully clockwise. |
| 4. | Yoke (deflection) | Move as far back as possible. |
| 5. | Blue and green screen controls | Fully counter clockwise. |
| 6. | Red screen control | Fully clockwise. |
| 7. | Purity magnets | Adjust by rotating either or both rings of purity magnets to produce a clean red area in the raster near the 8 o'clock position. The red area should be about one-half its diameter away from the edge of the screen. |
| 8. | Yoke (deflection) | Position for best red screen with no neck shadow or extreme edge purity error on blue or green screen. |
| 9. | Blue, green and red screen controls | Adjust for white raster. |
| 10. | Equalizing magnets | If necessary, adjust individual magnets adjacent to contaminated areas to produce a white raster. |
| 11. | Check the purity of each color screen to make certain that purity has not been sacrificed for sake of uniformity when adjusting edge magnets. | |

## VERTICAL CONVERGENCE ADJUSTMENTS

Connect RF output of a dot generator to the antenna terminals and tune them in on the receiver.

| STEP | ADJUST | REMARKS |
|---|---|---|
| 1. | Recheck "Preliminary Convergence Adjustments". | |
| 2. | Red, blue and green amplitude controls | Turn fully counter clockwise. |
| 3. | Red, blue and green DC controls and blue lateral magnet. | Adjust to produce a white dot at the center of screen. |
| 4. | Red and green vert. amplitude controls. | While observing center vertical row of dots, adjust to make red and green dots symmetrical about, or coincident with, the blue row of dots. |
| 5. | Repeat Step 3, if necessary. | |
| 6. | Red and green vert. tilt controls. | While observing the center vertical row of dots, adjust for maximum vertical convergence. |
| 7. | Repeat Step 3, if necessary. | |
| 8. | Blue vert. tilt and blue vert. amplitude controls. | Adjust to make blue dots equally spaced or coincident with the associated red and green dots along the vertical axis of the screen. (Observe the same center vertical row of dots as before). |
| 9. | Repeat Step 3, if necessary. | |
| 10. | The dots in the center vertical row should be nearly coincident at this time and form a vertical row of white dots. If necessary, repeat steps 4 thru 9. | |

## HORIZONTAL CONVERGENCE ADJUSTMENTS

| STEP | ADJUST | REMARKS |
|---|---|---|
| 1. | Blue horizontal amplitude slug (B3). | Turn fully counter clockwise. |
| 2. | Blue horizontal tilt slug (B4). | Fully counter clockwise. |
| 3. | Blue horizontal amplitude slug. | Turn to right until the blue dots have maximum downward displacement at the right side of the screen. |
| 4. | Blue horizontal tilt slug. | Adjust until the center horizontal row of dots is straight. |
| 5. | Red, blue and green DC controls and blue lateral magnet. | Adjust to produce a white dot at center of screen |
| 6. | Repeat steps 1 thru 4 using the red horizontal amplitude slug (B5) and red horizontal tilt (B6) adjusting red dots. | |
| 7. | Repeat steps 1 thru 4 using the green horizontal amplitude slug (B7) and green horizontal tilt (B8) adjusting green dots. | |
| 8 | Final touch-up of the convergence should now be made to obtain optimum convergence. | |
| 9. | Red, blue and green horizontal amplitude and tilt slugs. | Touch-up to get best overall horizontal convergence. |
| 10. | Red, blue and green vertical amplitude and tilt controls. | Touch-up for best overall vertical convergence. |
| 11. | Repeat Step 5, if necessary. | |

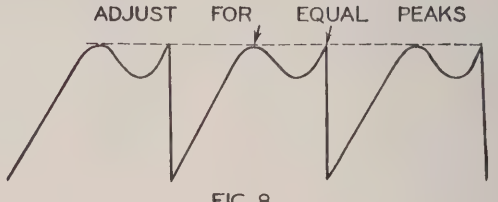
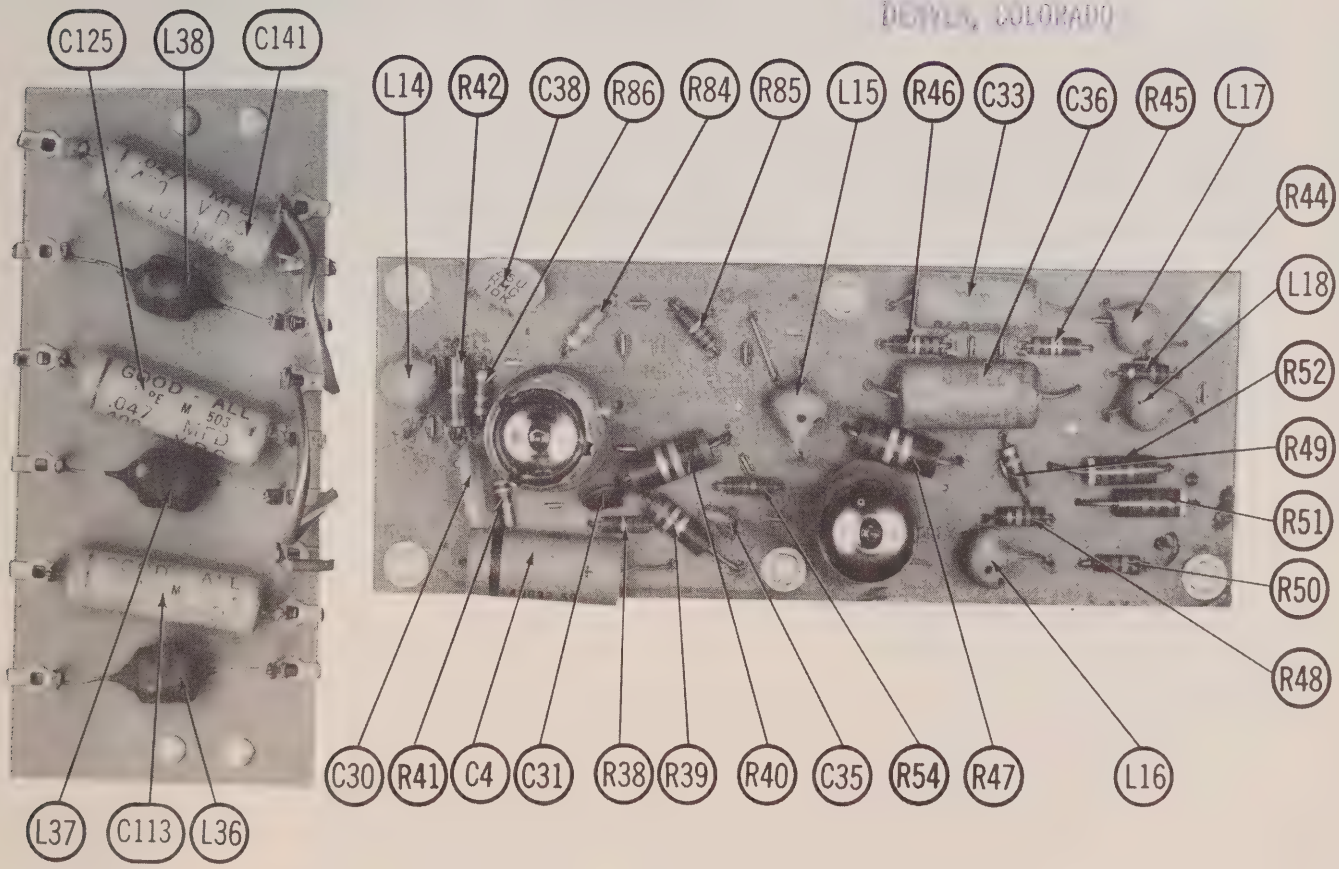


FIG. 8

# MISCELLANEOUS ADJUSTMENTS (cont.)

GRAY SCALE ADJUSTMENTS

| STEP | ADJUST | REMARKS |
|---|---|---|
| 1. | Tune in a black and white signal, preferably with a test pattern. | |
| 2. | Contrast control. | Fully clockwise. |
| 3. | Red, blue and green screen and brightness controls. | Fully counter clockwise. |
| 4. | Green and blue background controls. | Set at mid-range. |
| 5. | Red background control. | Connect DC probe of VTVM pin 2 (grid) of picture tube and common to pin 4 (red cathode) of picture tube. Adjust red background control for -90 volts on VTVM. |
| 6. | Brightness control. | With VTVM connected as above, adjust brightness control to reduce meter reading to-70 volts. |
| 7. | Red, blue and green screen controls. | Adjust for gray picture at low level. DO NOT change brightness control setting during this adjustment. DO NOT change setting of red screen or red background controls after this point in procedure. |
| 8. | At this point, one color will predominate when contrast and brightness controls are given normal settings. Depending on which color predominates the highlight areas, follow procedure of one the following paragraphs. | |
| | a. Green predominates highlights. Turn green background control SLIGHTLY counter clockwise making the picture magenta and while observing the lowlight areas, adjust the green screen control clockwise to obtain gray in the lowlight areas. | |
| | b. Blue predominates highlights. Turn blue background control SLIGHTLY counter clockwise making the picture yellow and while observing the lowlight areas, adjust the blue screen control clockwise to obtain gray in the lowlight areas. | |
| | c. Cyan (blue/green) predominates highlights. Turn the blue and green background controls SLIGHTLY counter clockwise making the picture red. Adjust blue and green screen controls to obtain gray in the lowlight areas. | |
| | d. Magenta predominates highlights. Turn green background control SLIGHTLY clockwise making picture green. Adjust green screen control counter clockwise to obtain gray in lowlight areas. | |
| | e. Yellow predominates highlights. Turn blue background control SLIGHTLY clockwise making the picture blue. Adjust the blue screen control counter clockwise to obtain gray in the lowlight areas. | |
| | f. Red predominates highlights. Turn blue and green background controls SLIGHTLY clockwise making the picture cyan. Adjust blue and green screen controls counter clockwise to obtain gray in lowlight areas. | |
| | Vary the brightness control through its entire range and observe all areas. No color should predominate in high or low brightness areas, at any setting of brightness control. | |




VIDEO PRINTED BOARD
SET 385 FOLDER 3

# ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

The high voltage should be disabled by removing M3 (3/4 Amp. fuse). Connect a 2500Ω, 100 watt resistor from point (A) to chassis.
Turn AGC control (R3B) fully clockwise and the noise control (R2B) fully counter clockwise.

VIDEO IF ALIGNMENT

Remove the bottom shield from the video IF printed board.
Connect the negative lead of a 9 volt bias supply to terminal "B" on the video IF printed board. Positive to chassis.
Connect the negative lead of a 4 volt bias supply to point (B). Positive to chassis.
Connect the negative lead of an 8 volt bias supply to point (C). Positive to chassis.
Turn sound reject control (R20) to the center of its range.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide a usable pattern on scope.

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 1. | 1500MMF | High side to point (D). Low side to chassis. | 44MC (10MC Swp) | 42.17MC 45.75MC | Between any two channels | Vert. Amp. thru detector (Fig. 1) to pin 5 (plate) of 6DE6 (V4). Low side to chassis. | A1, A2 | Adjust for maximum gain and symmetry of response similar to Fig. 2 with markers as shown. A1 is used to position markers at 50% and A2 is used to rock the top of curve. Replace shield over IF printed board. |
| 2. | .005MFD | High side to point (E). Low side to chassis. | Not used | 45.75MC | " | USE VTVM DC probe thru 10K to terminal "D" on video printed board. Common to terminal terminal "C" on video printed board. | A3 | Adjust for maximum deflection. |
| 3. | " | " | " | 45.0MC | " | " | A4 | " |
| 4. | " | " | " | 43.0MC | " | " | A5 | " |
| 5. | " | " | " | 44.0MC | " | " | A6 | " |
| 6. | " | " | " | 41.25MC | " | " | A7 | Adjust for MINIMUM deflection. |
| 7. | " | " | " | 47.25MC | " | " | A8 | " |
| 8. | " | " | " | 41.25MC | " | " | A9,R20 | Adjust for MINIMUM deflection. Use insulated tool for adjusting R20. |
| 9. | " | " | 44MC (10MC Swp) | 41.25MC 42.17MC 43.0MC 45.0MC 45.75MC 47.25MC | " | Vert. Amp. thru 10K to terminal "D" on the video printed board. Low side to chassis. | | Check for response similar to Fig. 3 with markers as shown. If necessary, retouch A4 to control high frequency side of curve. Adjust A6 to rock curve for desired response. |

SOUND IF ALIGNMENT

Connect bias as under "Video IF Alignment".
Connect two matched 100K (±1%)resistors in series from point (F) to chassis. The junction of these two resistors is alignment point (G) as shown on the schematic.

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | CHANNEL | CONNECT VTVM | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|
| 10. | .01MFD | High side to point (H). Low side to chassis. | 4.5MC (Unmod) | Between any two channels | DC probe to point (F). Common to chassis. | A10, A11, A12 | Use only enough generator output to provide a usable indication on VTVM. Adjust for maximum deflection. |
| 11. | " | " | " | " | DC probe to point (J). Common to point (G). | A13 | Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. |

VHF OSCILLATOR ALIGNMENT

Set the fine tuning at the center of its range. The adjustments are accessible, one at a time, as the channel selector is rotated. Adjust for best picture and sound.

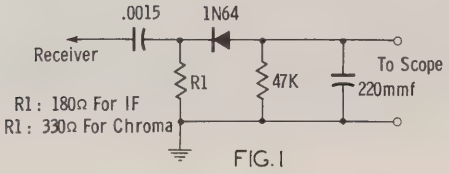


FIG. 1

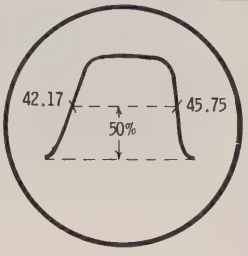


FIG. 2

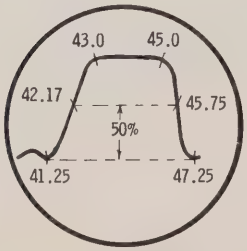


FIG. 3

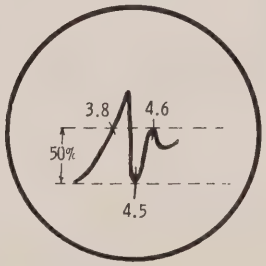


FIG. 4

# ALIGNMENT INSTRUCTIONS (cont)

CHROMA ALIGNMENT

Turn killer threshold control (R16A) and the AGC threshold control (R16B) fully counter clockwise. Set matrix balance control (R15) at the center of its range. Turn the chroma (color brilliance (R4) and contrast (R5) fully clockwise.
Connect the negative lead of an 8 volt bias supply to point Ⓒ. Positive to chassis.
Connect clip lead from pin 1 (grid) of 6CB6 (V23) to chassis to disable the chroma reference oscillator.
Connect the negative lead of an 8 volt bias supply to point Ⓚ. Positive to chassis.

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 12. | .05MFD | High side to terminal "D" on video printed board. Low side to chassis. | Not used | 4.5MC | Between an two channels | USE VTVM DC probe thru detector (Fig. 1) to pin 5 (plate) of 6BY6 (V25). Common to chassis. | A14 | Adjust for MINIMUM deflection. |
| 13. | " | " | " | 4.6MC | " | " | A15 | Adjust for maximum deflection. |
| 14. | " | " | " | 2.5MC | " | " | A16 | " |
| 15. | " | " | " | 4.0MC | " | " | A17 | " |
| 16. | " | " | " | 4.2MC | " | " | A18 | " |
| 17. | " | " | " | 2.8MC | " | " | A19 | " |
| 18. | " | " | 4.0MC (8MC Swp) | 3.8MC 4.5MC 4.6MC | " | Vert. Amp. thru detector to pin 9 (plate) of 6AW8 (V21). Low side to chassis. | | Check for response curve similar to Fig. 4. If necessary, retouch A15 for desired response. |
| 19. | " | High side to point Ⓛ. Low side to chassis. | " | 2.25MC 4.0MC | " | Vert. Amp. thru detector to pin 2 (grid) of 6AW8 (V22). Low side to chassis. | R4, R5 | Adjust for curve just before overload. Curve should be similar to Fig. 5. If necessary, retouch A17 to place markers at knee of curve. Retouch A18 for equal peaks. |
| 20. | " | " | " | " | " | Vert. Amp. thru detector to pin 5 (plate) of 6BY6 (V25). Low side to chassis. | | Check for response similar to Fig. 6. If necessary, retouch A19 for flat response. SLIGHT readjustment of A16 is permissable on the 2.25MC marker side of curve. SLIGHTLY retouch A17 to correctly position 4.0MC marker. |

CHROMA PHASING ADJUSTMENTS

Remove all bias voltage sources and test equipment leads. Remove the 2500Ω, 100 watt resistor and replace the fuse back into its socket. Remove the ground from pin 1 of V23.
Connect a color bar generator to the antenna terminals and tune them in on the receiver. Connect the vertical amplifier of the scope to terminal "C" of the video printed board and the low side to chassis. Adjust the AGC control for 10 volts peak to peak signal on the scope. Move the vertical amplifier of the scope to terminal "S" of the video printed board. Adjust the noise control (R2B) to a point just before the sync pulses start to clip.
Connect the DC probe of the VTVM to pin 1 (grid) of the 6CB6 (V23). Common to chassis. Use negative scale. Adjust A20 for maximum deflection, approximately -6 volts.
Connect the DC probe of the VTVM thru detector (Fig.1, change R1 to 100K)to terminal "D" of L30. Common to chassis. Adjust A21 for symmetrical swing of DC when the "Hue" control (R3A) is rocked back and forth. The reading obtained on the meter should be the same at both extreme settings of the hue control. The reading should be at minimum when the hue control is at mid-range. With the hue control set for MINIMUM reading, adjust A22 for maximum deflection and then A23 for MINIMUM deflection.
Connect the vertical amplifier of the scope to pin 2 (red grid) of the picture tube. Connect the low side to chassis. Retouch A20 for correct waveform of the R-Y signal as shown in Fig. 7. Move the vertical amplifier of the scope to pin 12 (blue grid) of the picture tube. If necessary, retouch A22 for proper B-Y waveform as shown in Fig. 7.
Move the scope connection back to pin 2 of the picture tube and adjust the hue control for proper R-Y waveform. Let the amplitude of the R-Y response curve represent 100%. Move the vertical amplifier of the scope to pin 12 (blue grid) of the picture tube. The amplitude of the pattern should be 60% of that at the red grid. If necessary, adjust the matrix balance control (R15) to make the amplitude at the blue grid 60%. Move the scope connection to pin 6 (green grid) of the picture tube. The amplitude of the waveform should be approximately 40.8% of the amplitude of the pattern on the red grid.
Connect the DC probe of the VTVM to point Ⓚ thru the detector probe. Common to chassis. Tune in a black and white signal and adjust the AGC threshold control (R16B) for -1 volt DC. Turn chroma (color brilliance) and contrast controls fully clockwise. Adjust killer threshold control (R16A) until color noise just disappears.

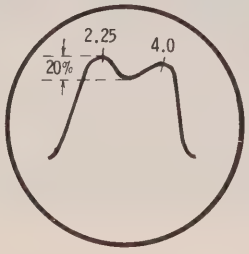



FIG. 5

FIG. 6

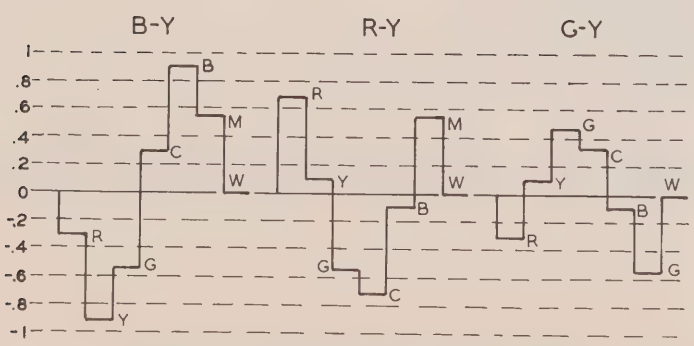
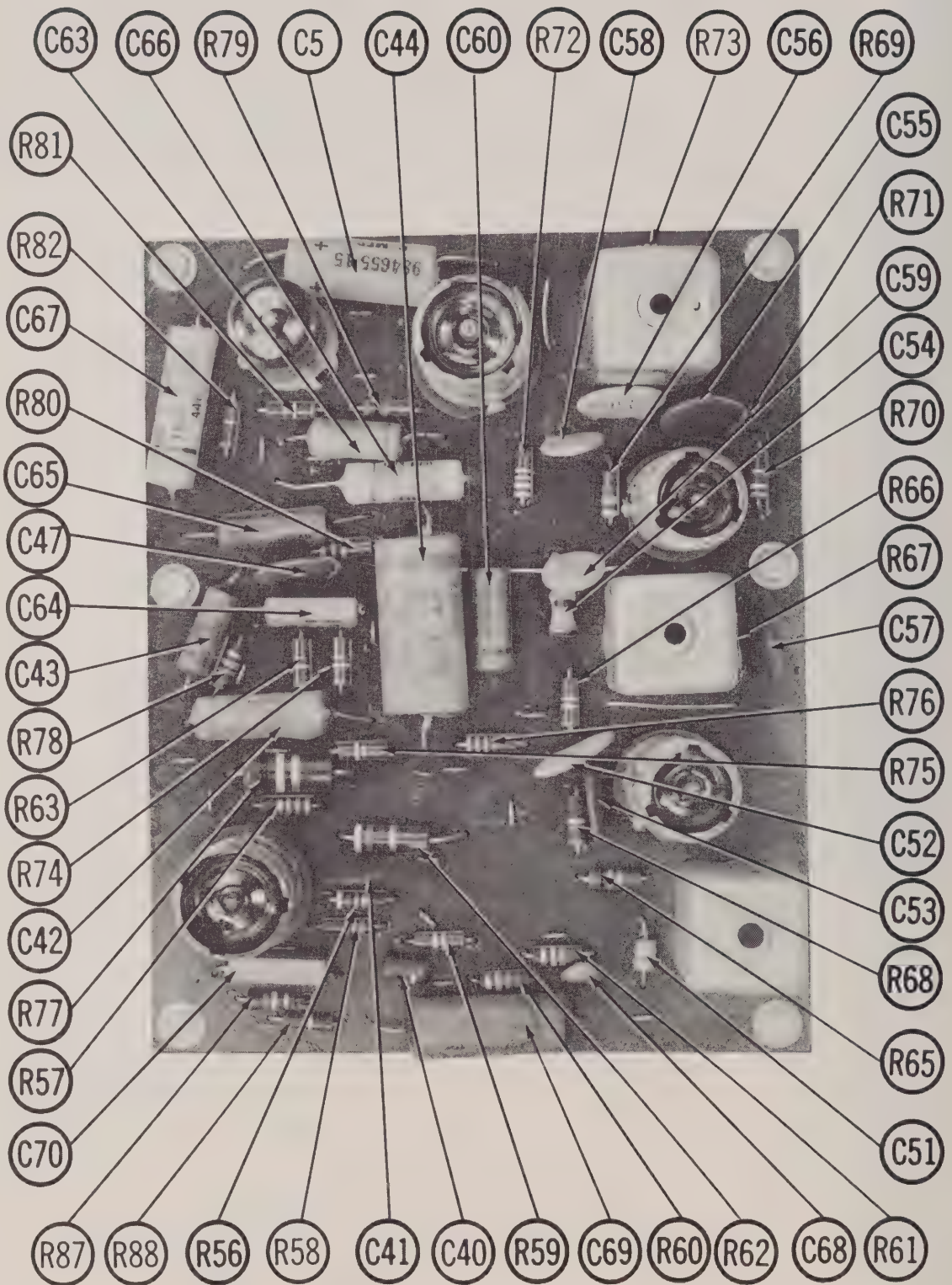



FIG. 7

HOFFMAN MODELS B2021, U, B4061, U, M2021, U, M4041, U, M4061, U, SP2021, U, SP4041, U, SP4061, U (Ch. 706, U)

FOLDER 3




SOUND PRINTED BOARD

CHASSIS TOP VIEW

# RESISTANCE MEASUREMENTS

| ITEM | TUBE | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 | Pin 8 | Pin 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| V1 | 6BN4 | 0Ω | 220K | 0Ω | .1Ω | ▪ 1500Ω | 0Ω | 220K | | |
| V2 | 6CG8 | 10K | ▪ 7500Ω | 0Ω | 0Ω | .1Ω | ▪ 1500Ω | ▪ 10K | 0Ω | 224K |
| V3 | 6DE6 | 34K | 68Ω | 0Ω | .1Ω | † 5300Ω | † 5300Ω | 0Ω | | |
| V4 | 6DE6 | 35K | 68Ω | 0Ω | .1Ω | † 5300Ω | † 5300Ω | 0Ω | | |
| V5 | 6CB6 | .1Ω | 180Ω | .1Ω | 0Ω | ▪ 470Ω | ▪ 470Ω | 0Ω | | |
| V6 | 6AW8 | 1000Ω | • 1.1meg | † 24K | 0Ω | .1Ω | 750Ω | 4500Ω | † 12K | † 7000Ω |
| V7 | 12BY7A | • 110Ω | 780K | 0Ω | 0Ω | 0Ω | .1Ω | † 4400Ω | † 22K | 0Ω |
| V8 | 6U8 | ▪ 1meg | ▪ 18K | † 5500Ω | 0Ω | .1Ω | 240K | ¶ | 0Ω | 2.5meg |
| V9 | 6AU6 | 2.4Ω | 0Ω | .1Ω | 0Ω | ▪ 1900Ω | ▪ 1900Ω | 120Ω | | |
| V10 | 6AU6 | 120K | 0Ω | .1Ω | 0Ω | ▪ 4000Ω | ▪ 19K | 0Ω | | |
| V11 | 6T8 | INF | 27K | INF | .1Ω | 0Ω | † 220K | 0Ω | 10meg | † 330K |
| V12 | 6AQ5 | 500K | ▪ 82Ω | .1Ω | 0Ω | † 950Ω | † 510Ω | 500K | | |
| V13 | 6CG7 | ▪ 9500Ω | 33K | 0Ω | .1Ω | 0Ω | • ‡3.2meg | • 2.3meg | 0Ω | 0Ω |
| V14 | 6AQ5 | • 1.9meg | • 50Ω | .1Ω | 0Ω | † 3000Ω | † 2700Ω | • 1.9meg | | |
| V15 | 6CG7 | † 650Ω | 1.3meg | 230K | .1Ω | 0Ω | † 28K | 250K | 0Ω | 0Ω |
| V16 | 6CB5 | † 10K | 0Ω | • 27Ω | 500K | 500K | • 27Ω | .1Ω | † 10K | TOP CAP ‡26Ω |
| V17 | 6AU4GTA | NC | NC | ¶ | NC | 47Ω | NC | 0Ω | .1Ω | |
| V18 | 1V2 | NC | NC | NC | 30meg | 30meg | NC | NC | NC | ‡40Ω |
| V19 | 3A3 | PINS 1 THRU 8 HAVE INFINITE RESISTANCE | | | | | | | | TOP CAP ‡450Ω |
| V20 | 6BK4 | 100K | † 10K | NC | NC | ‡900K | NC | † 10K | NC | TOP CAP INF |
| V21 | 6AW8 | 0Ω | 1.8meg | 950K | 0Ω | .1Ω | 0Ω | 1.4meg | † 7500Ω | † 7500Ω |
| V22 | 6AW8 | 270Ω | • 150Ω | † 22K | .1Ω | 0Ω | † 22K | 470K | 270Ω | † 1500Ω |
| V23 | 6CB6 | 68K | 0Ω | .1Ω | 0Ω | † 1700Ω | † 47K | 0Ω | | |
| V24 | 12BH7A | † 10K | 1meg | 390Ω | 0Ω | 0Ω | † 22K | 470K | 270Ω | .1Ω |
| V25 | 6BY6 | 470K | • 550Ω | .1Ω | 0Ω | † 6200Ω | ▪ 100Ω | .2Ω | | |
| V26 | 6BY6 | 470K | • 550Ω | .1Ω | 0Ω | † 6200Ω | ▪ 100Ω | .7Ω | | |
| V27 | 12BH7A | † 10K | 1meg | 390Ω | 0Ω | 0Ω | † 10K | 1meg | 390Ω | .1Ω |
| V28 | 5U4GB | NC | ¶ | NC | 9Ω | NC | 9Ω | NC | ¶ | |
| V29 | 5U4GB | NC | ¶ | NC | 9Ω | NC | 9Ω | NC | ¶ | |
| V30 | 21AXP22A | 30K | 320K | † 100K | † 70K | † 70K | 320K | † 100K | NC | 32meg |
| | | PIN 10 NC | PIN 11 † 330K | PIN 12 340K | PIN 13 † 70K | PIN 14 30K | | | | |

¶ THIS READING CAN VARY GREATLY, (10K MINIMUM), DUE TO THE CONDITION OF THE ELECTROLYTIC CAPACITOR CONNECTED IN THE ASSOCIATED CIRCUIT.

• THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.

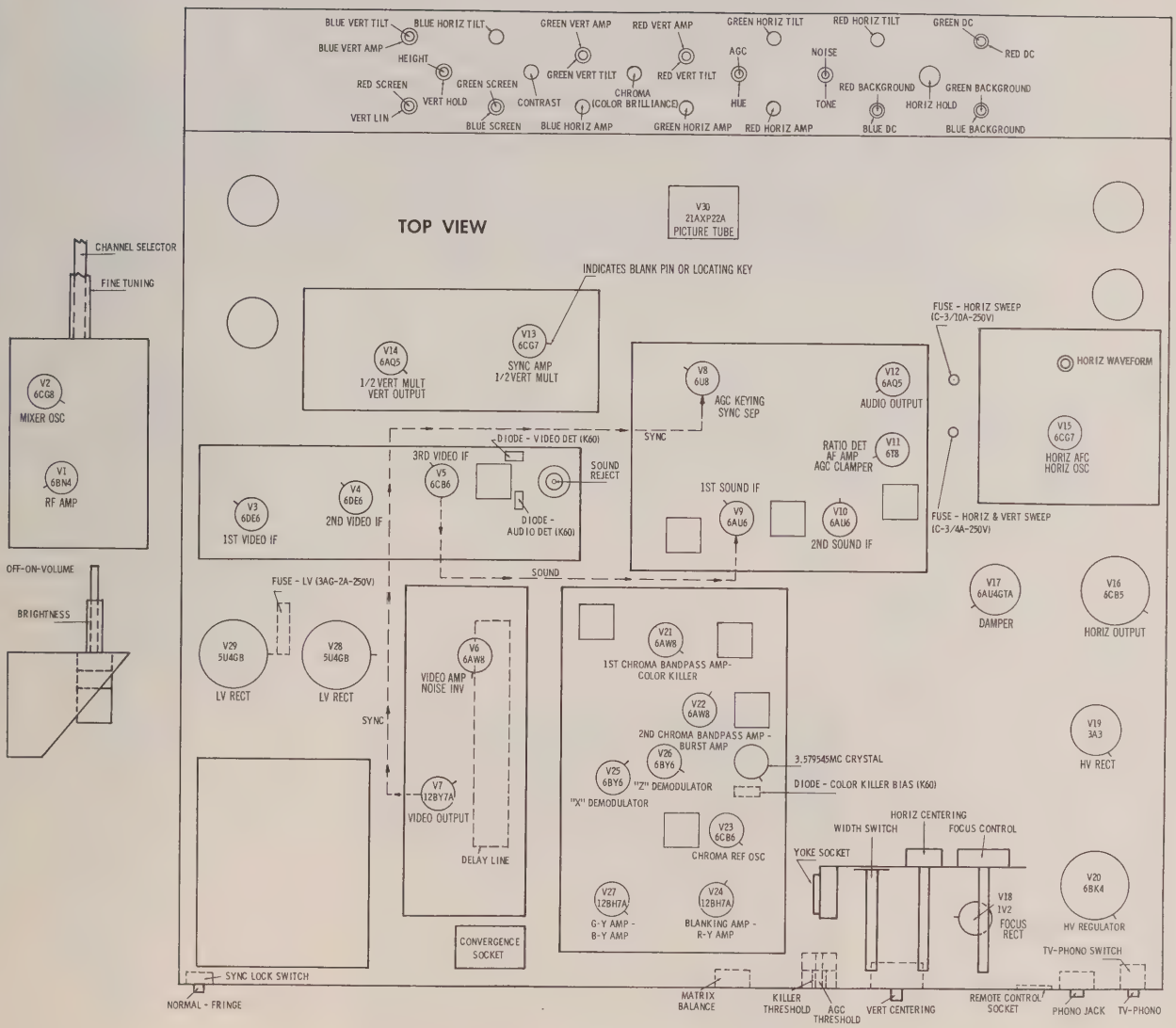
▪ MEASURED FROM 130V SOURCE.

† MEASURED FROM PIN 2 OF V29.

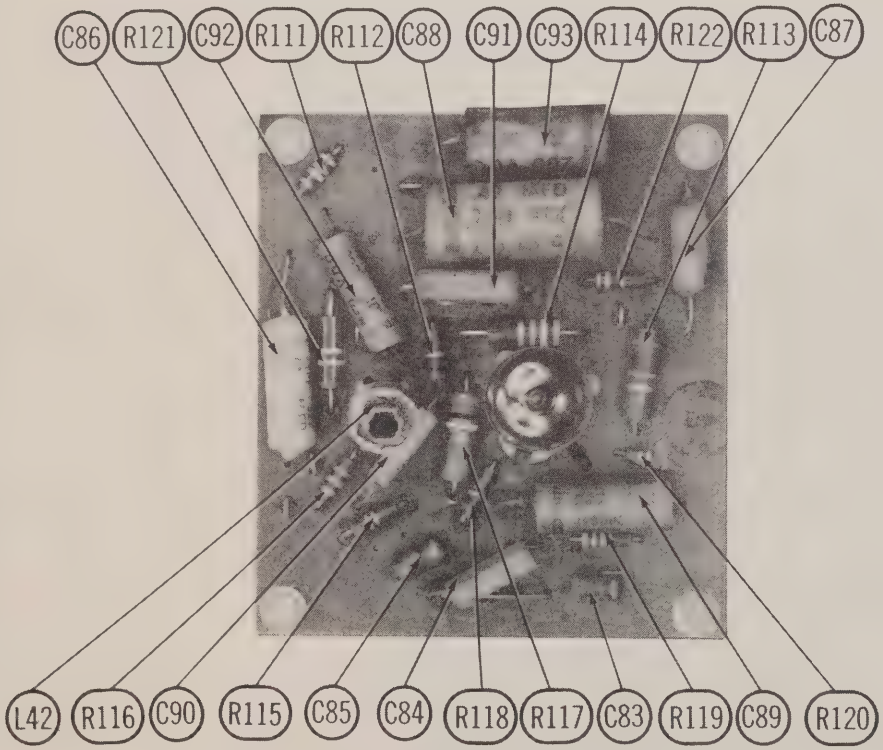
‡ MEASURED FROM PIN 3 OF V17.

NC NO CONNECTION

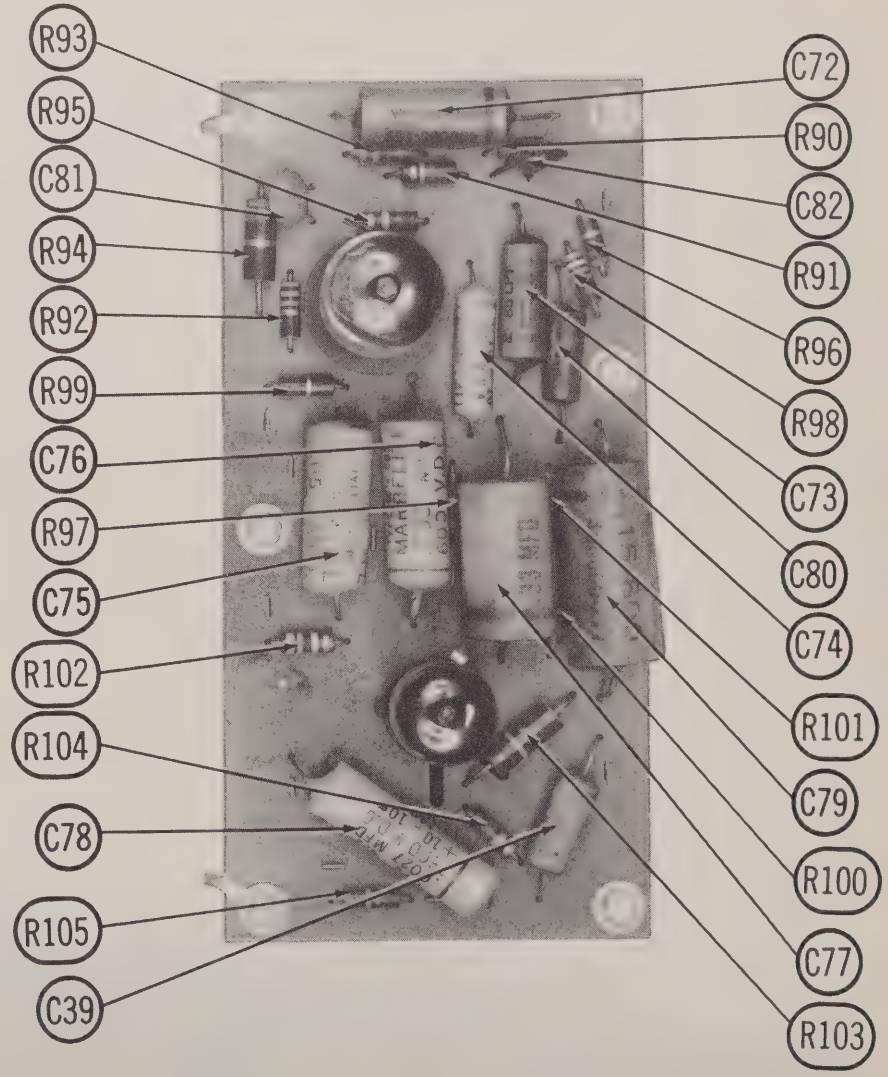
# TUBE PLACEMENT CHART



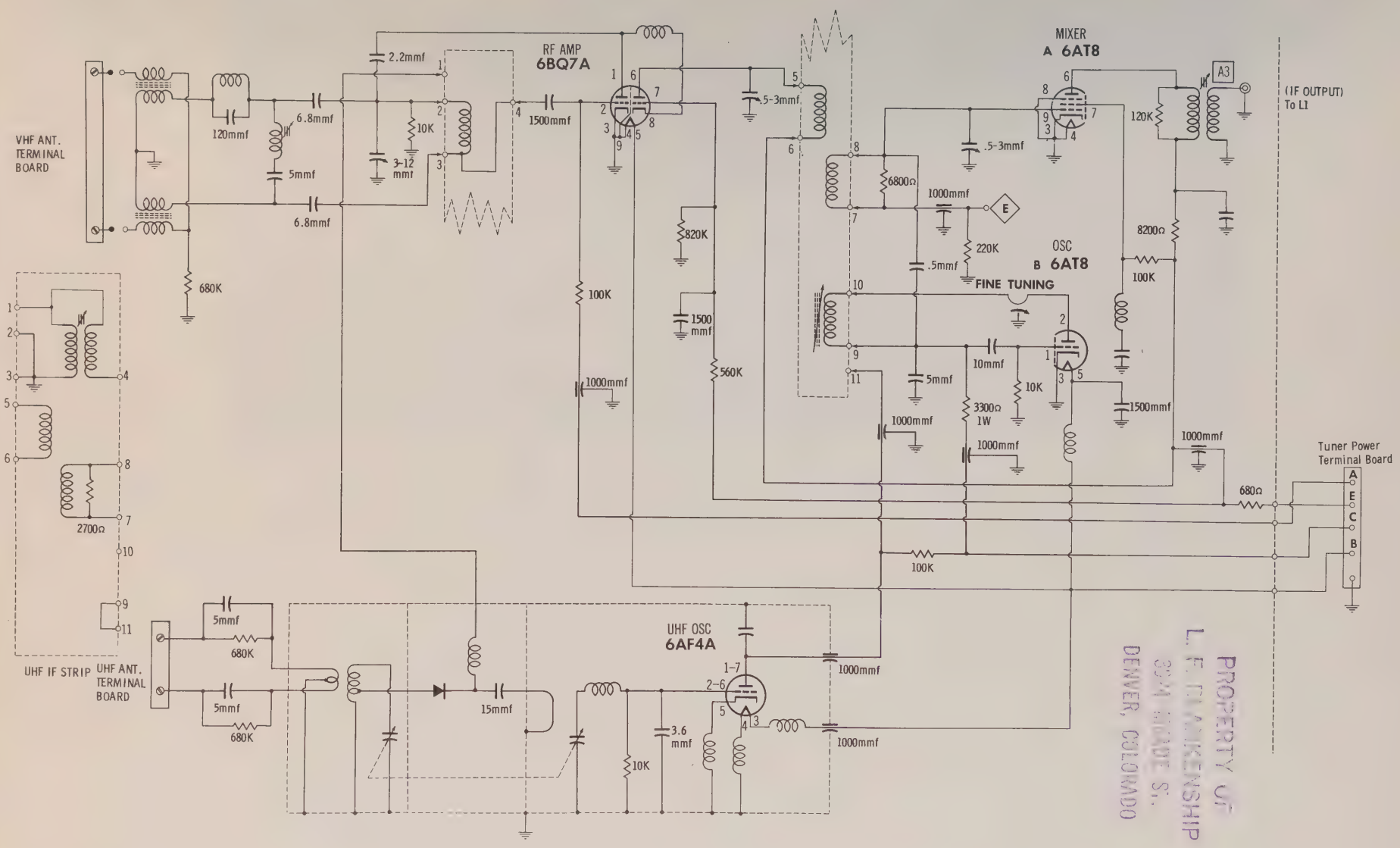

PROPERTY OF
[illegible]
DENVER, COLORADO




HORIZONTAL PRINTED BOARD




VERTICAL PRINTED BOARD




PROPERTY OF
L. F. HOFFMAN ENSHIP
3324 ARDEE ST.
DENVER, COLORADO

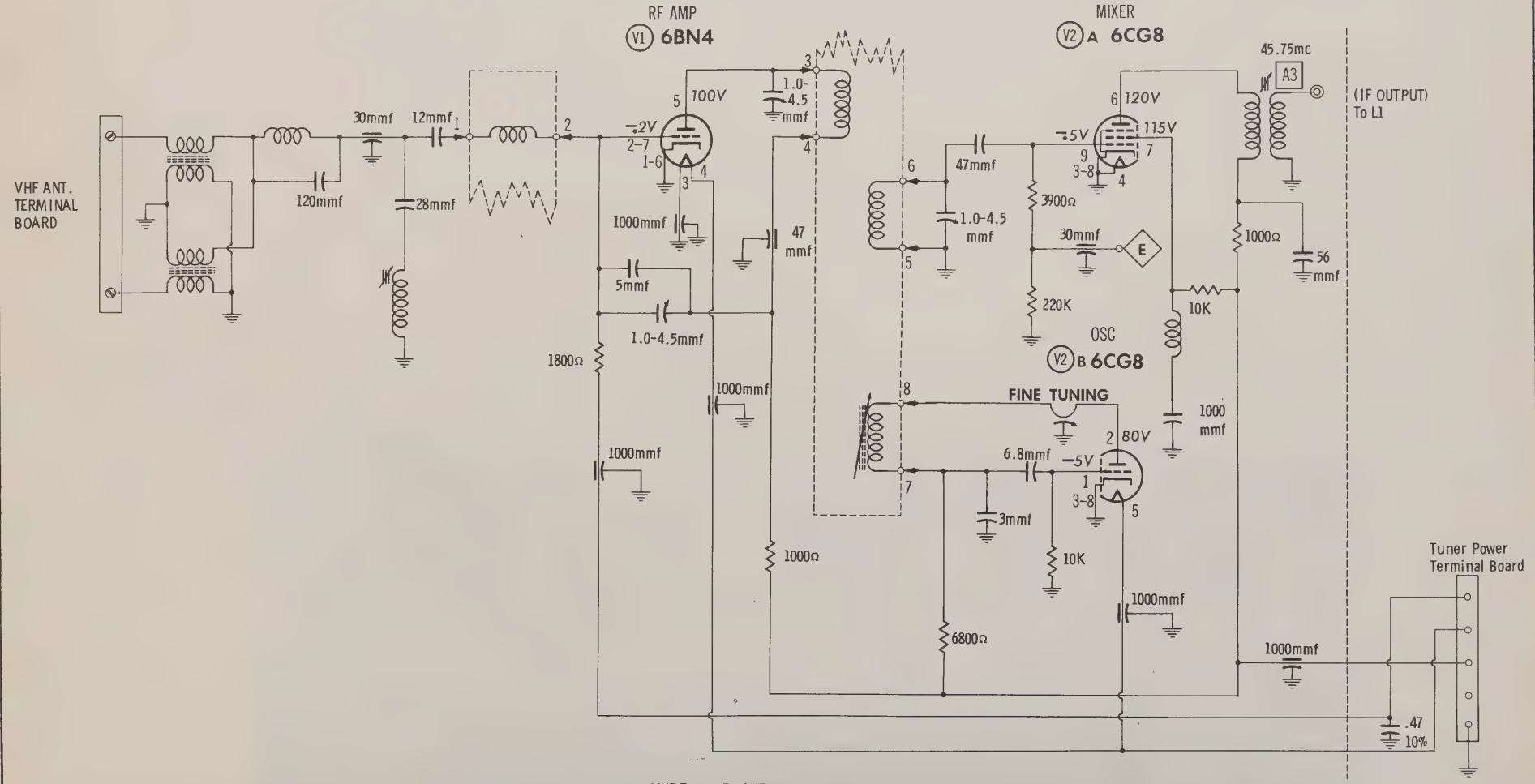
A PHOTOFACT STANDARD NOTATION SCHEMATIC
Howard W. Sams & Co., Inc. 1958

UHF-VHF Tuner Part #712003

## ALTERNATE TUNER SCHEMATIC

HOFFMAN MODELS B2021, U, B4041, U, B4061, U, M2021, U, M4041, U, M4061, U, SP2021, U, SP4041, U, SP4061, U (Ch. 706, U)

## CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION




VHF Tuner Part #710005

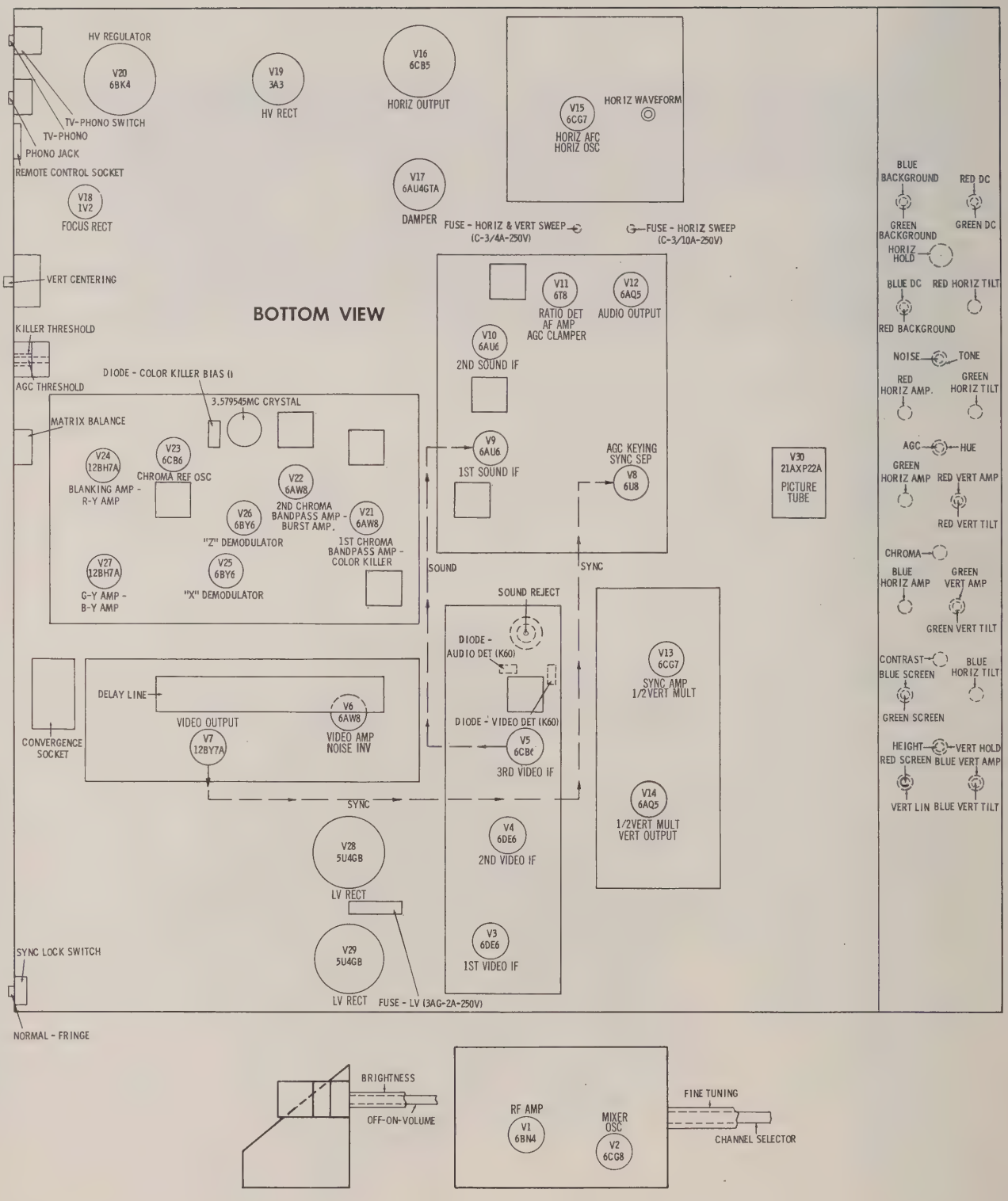
A PHOTOFACT STANDARD NOTATION SCHEMATIC
Howard W. Sams & Co., Inc. 1958

# TUNER SCHEMATIC

VIDEO IF PRINTED BOARD




HV COMPARTMENT




## TUBE PLACEMENT CHART

# PARTS LIST AND DESCRIPTIONS

## TUBES ( GENERAL ELECTRIC, SYLVANIA)

| ITEM No. | USE | TYPE | NOTES |
|---|---|---|---|
| V1 | RF Amplifier | 6BN4 | |
| V2 | Mixer-Osc. | 6CG8 | |
| V3 | 1st. Video IF Amp. | 6DE6 | |
| V4 | 2nd. Video IF Amp. | 6DE6 | |
| V5 | 3rd. Video IF Amp. | 6CB6 | |
| V6 | Video Amp. -Noise Inv. | 6AW8 | |
| V7 | Video Output | 12BY7A | |
| V8 | AGC Keying-Sync Sep. | 6U8 | |
| V9 | 1st. Sound IF Amp. | 6AU6 | |
| V10 | 2nd. Sound IF Amp. | 6AU6 | |
| V11 | Ratio Det. -AGC Clamper-AF Amp. | 6T8 | |
| V12 | Audio Output | 6AQ5 | |
| V13 | Sync Amp. -Vert. Mult. | 6CG7 | |
| V14 | Vert. Mult. -Vert. Output | 6AQ5 | |
| V15 | Horiz. AFC-Horiz. Osc. | 6CG7 | |
| V16 | Horiz. Output | 6CB5 | |
| V17 | Damper | 6AU4GTA | |
| V18 | Focus Rectifier | 1V2 | |
| V19 | HV Rectifier | 3A3 | |
| V20 | HV Regulator | 6BK4 | |
| V21 | 1st. Chroma Bandpass Amp. - Color Killer | 6AW8 | |
| V22 | 2nd. Chroma Bandpass Amp - Burst Amp. | 6AW8 | |
| V23 | Chroma Ref. Osc. | 6CB6 | |
| V24 | Blanking Amp. - R-Y Amp. | 12BH7A | |
| V25 | "X" Demodulator | 6BY6 | |
| V26 | "Z" Demodulator | 6BY6 | |
| V27 | G-Y Amp. - B-Y Amp. | 12BH7A | |
| V28 | LV Rectifier | 5U4GB | |
| V29 | LV Rectifier | 5U4GB | |

## PICTURE TUBE

| ITEM No. | REPLACEMENT DATA | | | NOTES |
|---|---|---|---|---|
| | HOFFMAN PART No. | GENERAL ELECTRIC PART No. | SYLVANIA PART No. | |
| V30 | 21AXP22A | 21AXP22A | 21AXP22A | |

## ELECTROLYTIC CAPACITORS

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | CAP. | VOLT. | HOFFMAN PART No. | AEROVOX PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | PYRAMID PART No. | SANGAMO PART No. | SPRAGUE PART No. |
| C1A | ▲80 | 450 | 856701 | AFH2-94-45 | | | TMD-58 | T-742 | TVL-2720 |
| B | ▲40 | 200 | | | | | | | |
| C2A | ▲80 | 450 | 856701 | AFH2-94-45 | B0480 | FP264.5 | TMD-58 | T-742 | TVL-2720 |
| B | ▲40 | 200 | | | | | | | |
| C3A | ▲50 | 450 | 856906 | AFH3-154-40 | C1103.5 | FP240 | | T-165 | R2432 * |
| B | ▲50 | 350 | | | | TC70 | | MT-4504 | |
| C | ■5 | 450 | | | | | | | |
| C4 | 2 | 350 | 856012 | PRS450V2 | BR245 | TC60 TC60 | TD-2-450 | MT-4502 | TVA-1701 |
| C5 | 5 | 50 | 856011 | PRS50V5 | BBR5-50 | TC30 | TD-5-50 | MT-0504 | TVA-1303 |
| C6A | ▲80 | 450 | 856701 | AFH2-94-45 | B0480 | FP264.5 | TMD-58 | T-742 | TVL-2720 |
| B | ▲40 | 200 | | | | | | | |
| C7 | 4 | 150 | 856013 | PRS150V4 | BBR4-150 | TC40 | TD-4-150 | MT-1504 | TVA-1402 |
| C8 | 4 | 450 | 856007 | PRS450V4 | BR445 | TC70 | TD-4-450 | MT-4504 | TVA-1702 |
| C9 | 8 | 10VAC | 856004 | PRS10VAC8 | BBR16-90 † BBR16-90 | TC108 | TD-16-150 † TD-16-150 | MT-1516 † MT-1516 | R2201 * |

† Connect negative leads together.
* Non-catalog item.

## FIXED CAPACITORS

**Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.**

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| | CAP. | VOLT | HOFFMAN PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | ERIE PART No. | MALLORY PART No. | SPRAGUE PART No. | |
| C10 | 12 | | 847301 | | TCZ-12 | C10Q12C | TCO-12 | | MS-412 | 5% |
| C11 | 8 | | 848001 | | | | | | | N220 5% |
| C12 | 8 | | 848001 | | | | | | | N220 5% |
| C13 | 22 | | 847201 | | | | | | | N220 5% |
| C14 | 2.2 | | 854035 | | | | | | | N3300 10% |
| C15 | 1.0 | | 854032 | | | | | | | N2200 |
| C16 | 1000 | | 850206 | BPD-001 | DD-102 | BYA6D1 | ED-1000 | DC521 | 5HK-D1 | |
| C17 | 680 | | 850401 | | | | | | | N2200 10% |
| C18 | 1000 | | 850206 | 1469-001 | | | | | | 10% |
| C19 | 1.5 | | 854033 | | | | | | | N3300 |
| C20 | 680 | | 850401 | | | | | | | N2200 10% |
| C21 | 1000 | | 850206 | 1469-001 | | | | | | 10% |
| C22 | 1.0 | | 854032 | | | | | | | N3300 |
| C23 | 1.0 | | 854032 | | | | | | | N3300 |
| C24 | 1.5 | | 854033 | NPO-SI 1.5 | TCZ-1R5 | C10V15C | TCO-1.5 | ZT-5515 | 5TCCB-V15 | 10% |
| C25 | 680 | | 850401 | | | | | | | N2200 10% |
| C26 | 1000 | | 850206 | 1469-001 | | | | | | 10% |
| C27 | 1000 | | 850206 | 1469-001 | | | | | | 10% |
| C28 | 10 | | 854043 | NPO-SI 10 | TCZ-10 | C10Q1C | TCO-10 | ZT-541 | 5TCC-Q1 | 10% |
| C29 | 22 | | 854047 | NPO-SI 22 | TCZ-22 | C10Q22C | TCO-22 | | 5TCC-Q22 | 10% |
| C30 | 3300 | | 850204 | 1464-0033 | | 1R5D33 | | | MS-233 | 10% |
| C31 | 680 | | 850208 | BPD-00068 | DD-681 | BYA10T68 | ED-680 | UC-5368 | 5GA-T68 | |
| C32A | 10000 | | 851001 | BPD-2X01 | DDM2-103 | BYD6DS1 | ED-01 | DC511 | 5HK-2S1 | |
| B | 10000 | | | | | | ED-01 | DC511 | | |
| C33 | .1 | 200 | 867075 | | | | | | | 10% |
| C34 | 22 | | 854047 | NPO-SI 22 | TCZ-22 | CTA6Q22C | TCO-22 | | MS-422 | 10% |
| C35 | 330 | | 850207 | 1469-00033 | | 5R5T33 | | | MS-333 | 10% |
| C36 | .22 | 200 | 867079 | | | | | | | 10% |
| C37 | 2200 | | 850201 | 1464-0022 | | | | | | 10% |
| C38 | 10000 | | 851002 | BPD-01 | DD-103 | BYA6S1 | ED-01 | DC511 | 5HK-S1 | |
| C39 | .01 | 200 | 867063 | 1464-01 | | | | | | 10% |
| C40 | 56 | | 850005 | 1469-000056 | TCZ-56 | 22R5Q56 | TCO-56 | | MS-456 | 10% |
| C41 | 10000 | | 851002 | BPD-01 | DD-103 | BYA6S1 | ED-01 | DC511 | 5HK-S1 | |
| C42 | .047 | 200 | 867071 | BPD-05 | DF-503 | CUB2S47 | | GEM-2147 | 2TM-S47 | |
| C43 | .0022 | 600 | 867255 | BPD-0022 | D6-222 | CUB6D22 | GP-2200 | GEM-6122 | 6TM-D22 | |
| C44 | .47 | 200 | 867083 | P288N-47 | | CUB2P47 | | GEM-2047 | 2TM-P47 | |
| C45 | 1000 | | 850206 | 1464-001 | | 1R5D1 | ED-1000 | | MS-21 | |
| C46 | 1000 | | 850206 | BPD-001 | DD-102 | BYA6D1 | ED-1000 | DC521 | MS-21 | |
| C47 | 10000 | | 851002 | BPD-01 | DD-103 | BYA6S1 | ED-01 | DC511 | 5HK-S1 | |
| C48 | 10000 | | 867263 | BPD-01 | DD-103 | BYA6S1 | ED-01 | DC511 | 5HK-S1 | |
| C49 | .47 | 100 | 867083 | | | | | GEM-2047 | | 10% |
| C50 | 10 | | 854043 | NPO-SI 10 | TCZ-10 | CTA6Q1C | GP-10 | ZT-541 | 5TCC-Q1 | 10% |
| C51 | 4.7 | | 854039 | NPO-SI 4.7 | TCZ-4R7 | CTA6V47C | TCO-4.7 | ZT-5547 | 5TCCB-V47 | 10% |
| C52 | 3300 | | 8540204 | 1464-0033 | | 1R5D33 | | | MS-233 | 10% |
| C53 | 10000 | | 851002 | BPD-01 | DD-103 | BYA6S1 | ED-01 | DC511 | 5HK-S1 | |
| C54 | 18 | | 847202 | | TCZ-18 | CTA6Q18C | TCO-18 | | | NPO |
| C55 | 10000 | | 851002 | BPD-01 | DD-103 | BYA6S1 | ED-01 | DC511 | 5HK-S1 | |

DEPARTMENT OF
SHIP
DENVER, COLORADO

# PARTS LIST AND DESCRIPTIONS (Continued)

## CAPACITORS (cont)

| ITEM No. | RATING CAP. | RATING VOLT | REPLACEMENT DATA HOFFMAN Part No. | AEROVOX Part No. | CENTRALAB Part No. | CORNELL DUBILIER Part No. | ERIE Part No. | MALLORY Part No. | SPRAGUE Part No. | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| C56 | 3300 | | 8503064 | 1454-0023 | | 1R5D33 | | | | 10% |
| C57 | 10000 | | 8503083 | BPD-01 | DD-103 | BYA851 | ED-01 | DC511 | 5HK-51 | |
| C58 | 1200 | | 8503036 | 1454-0013 | | 1R5D23 | GP-1200 | | MS-323 | 10% |
| C59 | 3000 | | 8503056 | 1454-001 | | 1R5D1 | GP-1000 | | MS-321 | 10% |
| C60 | .01 | 600 | 8507163 | | | | | | | 10% |
| C61 | .0068 | 600 | 8507060 | 1454-0056 | | 1DR5D68 | | | MS-356 | 10% |
| C62 | 30000 | | 8507083 | BPD-01 | DD-103 | BYA851 | ED-01 | DC511 | 5HK-51 | |
| C63 | .01 | 600 | 8507063 | 1454-01 | | 1DR3D1 | | | | 10% |
| C64 | 270 | | 8503106 | 1459-00027 | TCZ-270 | 5R5T27 | CY15C271J | | MS-327 | 10% |
| C65 | .0047 | 600 | 8507059 | 1454-0047 | | | | | | 10% |
| C66 | .002 | 600 | 8507057 | | | | | | | 10% |
| C67 | .0033 | 1600 | 8507157 | | | | | | GEM-1633 | 10% |
| C68 | 330 | | 8503071 | 1459-00033 | D6-331 | L10T33 | GP-330 | | MS-333 | 10% |
| C69 | .1 | 600 | 8507175 | | | | | | | 10% |
| C70 | 330 | | 8503103 | 1459-00033 | D6-331 | 5R5T33 | CY15C331J | | MS-333 | 10% |
| C71 | 47 | | 8504081 | NPO-SI 47 | DD-470 | L10Q47 | GP-47 | | STCC-Q47 | 10% |
| C72 | .033 | 600 | 8507169 | | | | | | | 10% |
| C73 | .01 | 600 | 8507163 | | | | | | | 10% |
| C74 | .0033 | 600 | 8507157 | | 1454-0033 | | 1R5D33 | | MS-333 | 10% |
| C75 | .01 | 600 | 8507163 | | | | | | | 10% |
| C76 | .033 | 600 | 8507169 | | | | | | | 10% |
| C77 | .33 | 200 | 8507081 | | | | | | GEM-3033 | 10% |
| C78 | .0047 | 1000 | 8507156 | | | | | | | 10% |
| C79 | .15 | 600 | 8507177 | | | | | | GEM-6015 | 10% |
| C80 | .0068 | 600 | 8507153 | | 1454-0035 | | 1R5D35 | GP-1500 | MS-315 | 10% |
| C81 | 220 | | 8503099 | 1454-00033 | D6-331 | | 1ZR5T33 | GP-330 | MS-333 | 10% |
| C82 | 1000 | | 8503096 | 1454-001 | | | 1R5D1 | GP-1000 | MS-321 | 10% |
| C83 | 33 | | 8503053 | NPO-SI 13 | TCZ-13 | | CY5AQ130C | TCC-13 | MS-413 | 5% |
| C84 | 82 | | 8503105 | 1459-00082 | TCZ-82 | | 2ZR5Q83 | CY10C830K | MS-483 | 10% |
| C85 | 82 | | 8503094 | NPO-SI 13 | TCZ-82 | | 2ZR5Q82 | CY10C820J | MS-482 | 5% |
| C86 | .01 | 600 | 8503167 | | | | | | | 10% |
| C87 | .01 | 200 | 8507084 | 1454-01 | | | 1DR3D1 | | | 10% |
| C88 | .47 | 200 | 8507083 | | | | | | GEM-3047 | 10% |
| C89 | .047 | 400 | 8507171 | | | | | | | 10% |
| C90 | 330 | 1000 | 8503203 | | | | | | | 5% |
| C91 | 1000 | | 8503201 | 1454-001 | | | 1R5D1 | | MC2E351 | MS-321 | 5% |
| C92 | .01 | 600 | 8507163 | | | | | | | 10% |
| C93 | .22 | 200 | 8507082 | | | | | | GEM-3033 | 10% |
| C94 | .1 | 600 | 8507175 | | | | | | | 10% |
| C95 | .22 | 600 | 8507179 | | | | | | GEM-6033 | 10% |
| C96 | 470 | | 8503203 | N750-SI 470 | | | TC7-470 | | | N750 |
| C97 | .47 | 200 | 8507083 | | | | | | GEM-3047 | 10% |
| C98 | .47 | 200 | 8507083 | | | | | | GEM-3047 | 10% |
| C99 | .15 | 600 | 8507177 | | | | | | GEM-6015 | 10% |
| C100 | .1 | 600 | 8507175 | | | | | | | 10% |
| C101 | 390 | 2000 | 8503053 | | | | | | | N2200 10% |
| C102 | 390 | 2000 | 8503053 | | | | | | | N2200 10% |
| C103 | 82 | 5000 | | | | | | | | |
| C104 | .0033 | 600 | 8507157 | | | | | | | 10% |
| C105 | 56 | 5000 | 8503051 | | | | | | | N750 |
| C106 | .047 | 600 | 8507171 | | | | | | | 10% |
| C107 | .47 | 200 | 8507083 | | | | | | GEM-3047 | 10% |
| C108 | .39 | 200 | 8507182 | | | | | | | 10% |
| C109 | .39 | 200 | 8507183 | | | | | | | 10% |
| C110 | .47 | 200 | 8507083 | | | | | | GEM-3047 | 10% |
| C111 | 10000 | | 8503102 | BPD-01 | DD-103 | BYA851 | ED-01 | DC511 | 5HK-51 | |
| C112 | .047 | 400 | 8507171 | | | | | | | 10% |
| C113 | .047 | 400 | 8507171 | | | | | | | 10% |
| C114 | 82 | | 8504054 | | | TCN-82 | CY5AQ82U | TCT-82 | | N750 10% |
| C115 | 27 | | 8504048 | | | TCN-27 | CY5AQ27U | TCT-27 | | N750 10% |
| C116 | 680 | | 8503098 | 1454-00068 | D6-681 | 1R5T68 | GP-680 | | MS-368 | 10% |
| C117 | .1 | 200 | 8507175 | | | | | | GEM-201 | 10% |
| C118 | 10000 | | 8503102 | BPD-01 | DD-103 | BYA851 | ED-01 | DC511 | 5HK-51 | |
| C119 | 50-180 | | 8732003 | | | | | | | |
| C120 | 10000 | | 8503102 | BPD-01 | DD-103 | BYA851 | ED-01 | DC511 | 5HK-51 | |
| C121 | 10000 | | 8503102 | BPD-01 | DD-103 | BYA851 | ED-01 | DC511 | 5HK-51 | |
| C122 | 1000 | | 8503096 | 1454-001 | | 1R5D1 | GP-1000 | MC2B351 | MS-321 | 10% |
| C123 | 82 | | 8504043 | N750-SI 10 | TCN-10 | CY5AQ10 | TCT-10 | NT-542 | STCU-Q2 | N750 10% |
| C124 | .047 | 400 | 8507171 | | | | | | | 10% |
| C125 | .047 | 400 | 8507171 | | | | | | | 10% |
| C126 | 10000 | | 8503102 | BPD-01 | DD-103 | BYA851 | ED-01 | DC511 | 5HK-51 | |
| C127 | 10000 | | 8503102 | BPD-01 | DD-103 | BYA851 | ED-01 | DC511 | 5HK-51 | |
| C128 | .1 | 200 | 8507175 | | | | | GEM-201 | | 10% |
| C129 | 100 | | 8504055 | N750-SI 100 | TCN-100 | CY5ATU | TCT-100 | NT-531 | STCU-T3 | N750 10% |
| C130 | 470 | | 8503123 | 1454-00047 | D6-471 | 5R5T47 | GP-470 | | MS-347 | 10% |
| C131 | 1000 | | 8503096 | BPD-001 | DD-103 | BYA851 | ED-1000 | DC531 | 5HK-51 | |
| C132 | 10000 | | 8503102 | BPD-01 | DD-103 | BYA851 | ED-01 | DC511 | 5HK-51 | |
| C133 | 2.0 | | 8503052 | | | | | | | N1500 |
| C134 | 6.0 | | 8503098 | | | | C10V6C | | | N750 |
| C135 | 10000 | | 8503102 | BPD-01 | DD-103 | BYA851 | ED-01 | DC511 | 5HK-51 | |
| C136 | 10000 | | 8503102 | BPD-01 | DD-103 | BYA851 | ED-01 | DC511 | 5HK-51 | |
| C137 | 330 | | 8503107 | N750-SI 330 | | C10T33U | TCT-330 | | STCU-T33 | N750 10% |
| C138 | 1000 | | 8503206 | 1454-001 | | 1R5D1 | GP-1000 | MC2B351 | MS-321 | 10% |
| C139 | 82 | | 8504043 | N750-SI 10 | TCN-10 | CY5AQ10 | TCT-10 | NT-542 | STCU-Q2 | N750 10% |
| C140 | .047 | 400 | 8507171 | | | | | | | 10% |
| C141 | .047 | 400 | 8507171 | | | | | | | 10% |
| C142 | .047 | 600 | 8507231 | | | DF-303 | | GEM-5147 | RTM-S47 | 10% |

## CONTROLS

| ITEM No | RATING RESISTANCE | RATING WATTS | REPLACEMENT DATA HOFFMAN Part No | CENTRALAB Part No. | CLAROSTAT Part No | IRC Part No. | MALLORY Part No | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|
| R1A | 250K | | 8032008 | F1-34 | | | U113T39 | Brightness |
| B | 1Meg | | R2-57 | | | | U132T39 | Volume - Tap @ 250K |
| C | Switch | | K31-1 | | | | Not Req. | |
| D | Cover | | K31-5 | | | | | |
| R2A | 2.5Meg | | 8032018 | F1-78 | | | U132G52 | Tone |
| B | 2.5Meg | | | R3-78 | | | Not Req. | Noise |
| R3A | 500Ω | | 8032014 | F1-4 | | | U13T7 | Hue |
| B | 500K | | | R3-40 | | | Not Req. | AGC |
| R4 | 500Ω | | 8000211 | F1-4 | | | U132G01 | Chroma (Color Brilliance) |
| R5A | 500Ω | | 8032017 | | | | U296 | Contrast (Color) |
| B | 500Ω | | | | | | Not Req. | Contrast |
| R6A | 2.5Meg | | 8032015 | F1-76 | | | U132G01 | Vert. Hold |
| B | 5Meg | | | R3-83 | | | Not Req. | Height |
| R7A | 2Meg | | 8032006 | F1-67 | | | U13T3 | Blue Background |
| B | 2Meg | | | R3-67 | | | Not Req. | Green Background |
| R8A | 100Ω | | 8032003 | | | | U276 | Blue DC - tap @ 75Ω |
| B | 2Meg | | | | | | Not Req. | Red Background |
| R9A | 1Meg | | 8032004 | F1-61 | | | U13E51 | Blue Screen |
| B | 1Meg | | | R3-51 | | | Not Req. | Green Screen |

## CONTROLS (cont)

| ITEM No | RATING RESISTANCE | RATING WATTS | REPLACEMENT DATA HOFFMAN Part No. | CENTRALAB Part No. | CLAROSTAT Part No. | IRC Part No. | MALLORY Part No. | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|
| R10A | 2.5Meg | | 8032005 | F1-76 | | | U13G61 | Vert. Lin. |
| B | 1Meg | | | R3-51 | | | Not Req. | Red Screen |
| R11A | 100Ω | | 8032001 | | | | U27G | Red DC - Tap @ 75Ω |
| B | 100Ω | | | | | | Not Req. | Green DC - Tap @ 75Ω |
| R12A | 100Ω | | 8032003 | | | | U27G | Red Vert. Amp. |
| B | 100Ω | | | | | | Not Req. | Red Vert. Tilt |
| R13A | 100Ω | | 8032003 | | | | U27G | Green Vert. Amp. |
| B | 100Ω | | | | | | Not Req. | Green Vert. Tilt |
| R14A | 100Ω | | 8032003 | | | | U27G | Blue Vert. Amp. |
| B | 100Ω | | | | | | Not Req. | Blue Vert. Tilt |
| R15A | 100Ω | | 8000011 | AB-83 | | | | Matrix Balance |
| B | 25Ω | | | AK-1 | | | | |
| R16A | 2.5Meg | | 8032007 | F1-76 | | | | Killer Threshold |
| B | 2.5Meg | | | R3-76 | | | | AGC Threshold |
| R17A | 400 | 2(WW) | 8058001 | WN-500 | A43-40 | WP540 | R50L | Vert. Centering |
| B | Shaft | | | Not Req. | F433-1/4 | Not Req. | Not Req. | |
| R18 | 100Ω | | 8000012 | | | | | Horiz. Centering |
| R19 | 200K | | 8000013 | | | | | Focus |
| R20 | 500Ω | | 8000123 | | | | | Sound Reject |

## RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

| ITEM No | RATING OHMS | RATING WATT | HOFFMAN Part No | NOTES |
|---|---|---|---|---|
| R21 | 470Ω | | 8241S8 | |
| R22 | 6200Ω | 10 | 625464 | |
| R23 | 68Ω 5% | | 814035 | |
| R24 | 100K 5% | | 814111 | |
| R25 | 1000Ω | | 814192 | |
| R26 | 68Ω 5% | | 814035 | |
| R27 | 5000Ω | | 814192 | |
| R28 | 8200Ω 5% | | 814085 | |
| R29 | 82K 5% | | 814109 | |
| R30 | 1000Ω | | 814192 | |
| R31 | 68Ω 5% | | 814035 | |
| R32 | 9900Ω | 7 | 524455 | |
| R33 | 68K 5% | | 814107 | |
| R34 | 4700 | | 814188 | |
| R35 | 180Ω 5% | | 814045 | |
| R36 | 10K | | 814304 | |
| R37 | 3900Ω 5% | | 814071 | |
| R38 | 220Ω | | 814194 | |
| R39 | 56K | | 814230 | |
| R40 | 15K | 2 | 814206 | |
| R41 | 33Ω 5% | | 814027 | |
| R42 | 15000 5% | | 814067 | |
| R43 | 4700Ω 5% | | 814070 | |
| R44 | 18000 5% | | 814069 | |
| R45 | 180K | | 814219 | |
| R46 | 680K | | 814236 | |
| R47 | 22K | 2 | 814208 | |
| R48 | 18K | | 814207 | |
| R49 | 56K | | 814223 | |
| R50 | 68K | | 814224 | |
| R51 | 8100 5% | | 814162 | |
| R52 | 8100 5% | | 814162 | |
| R53 | 2700Ω 5% | 7 | 534149 | |
| R54 | 220Ω 5% | | 814047 | |
| R55 | 1000 5% | | 814039 | |
| R56 | 47K | | 814213 | |
| R57 | 33K | | 814210 | |
| R58 | 27K | | 814209 | |
| R59 | 22K | | 814208 | |
| R60 | 18K | | 814207 | |
| R61 | 270K | | 814221 | |
| R62 | 4700Ω | 1 | 814070 | |
| R63 | 820K 5% | | 814133 | |
| R64 | 10000 | | 814192 | |
| R65 | 100K | | 814216 | |
| R66 | 150K | | 814218 | |
| R67 | 1000Ω | 2 | 814196 | |
| R68 | 120Ω | | 814181 | |
| R69 | 120K | | 814217 | |
| R70 | 3900Ω | | 814199 | |
| R71 | 15K | | 814206 | |
| R72 | 39K | | 814211 | |
| R73 | 27K 5% | | 814097 | |
| R74 | 120K 5% | | 814115 | |
| R75 | 150K 5% | | 814116 | |
| R76 | 33K 5% | | 814099 | |
| R77 | 100K | 2 | 814216 | |
| R78 | 1K | | 814201 | |
| R79 | 10Meg | | 814240 | |
| R80 | 330K | | 814232 | |
| R81 | 820K 5% | | 814133 | |
| R82 | 1.5Meg 5% | | 814139 | |
| R83 | 39K | | 814211 | |
| R84 | 470K | | 814224 | |
| R85 | 1Meg | | 814243 | |
| R86 | 330K | | 814186 | |
| R87 | 270K | | 814231 | |
| R88 | 2.2Meg | | 814232 | |
| R89 | 470K | | 814224 | |
| R90 | 1Meg | | 814228 | |
| R91 | 560K | | 814235 | |
| R92 | 33K | | 814210 | |
| R93 | 2700Ω 5% | | 814073 | |
| R94 | 6800Ω | 1 | 814209 | |
| R95 | 120K | | 814217 | |
| R96 | 6.8Meg | | 814238 | |
| R97 | 1Meg | | 814228 | |
| R98 | 39K | | 814211 | |
| R99 | 2.2Meg | | 814232 | |
| R100 | 18K 5% | | 814091 | |
| R101 | 18K 5% | | 814093 | |
| R102 | 470K | | 814224 | |
| R103 | 22K 5% | 1 | 814095 | |
| R104 | 120K | | 814217 | |
| R105 | 820K 5% | | 814133 | |
| R106 | 2.7Meg | 1 | 814240 | |

| ITEM No | RATING OHMS | RATING WATT | HOFFMAN Part No | NOTES |
|---|---|---|---|---|
| R107 | 100K | | 814216 | |
| R108 | 2.7Meg 5% | | 814145 | |
| R109 | 12000 5% | | 814065 | |
| R110 | 12000 5% | | 814065 | |
| R111 | 470K | | 814224 | |
| R112 | 1Meg | | 814228 | |
| R113 | 82K | 1 | 814222 | |
| R114 | 33K | 1 | 814218 | |
| R115 | 150K | | 814216 | |
| R116 | 68K | | 814214 | |
| R117 | 100K 5% | 1 | 814111 | |
| R118 | 150K 5% | | 814115 | |
| R119 | 330K | | 814222 | |
| R120 | 820K | | 814227 | |
| R121 | 82K | 1 | 814222 | |
| R122 | 3300Ω | | 814189 | |
| R123 | 130Ω | | 814181 | |
| R124 | 10K | 10 | 525475 | |
| R125 | 56Ω | | 814177 | |
| R126 | 4700Ω | 1 | 814207 | |
| R127 | 1Meg | 2 | 814228 | |
| R128 | 1Meg | 2 | 814228 | |
| R129 | 10Meg | 2 | 814240 | |
| R130 | 10Meg | 2 | 814240 | |
| R131 | 10Meg | 2 | 814240 | |
| R132 | 1.8Meg 5% | 1 | 814141 | |
| R133 | 100Meg | 1 | 814372 | |
| R134 | 1.8Meg 5% | 1 | 814141 | |
| R135 | 39K | | 814209 | |
| R136 | 470K | | 814224 | |
| R137 | 22K | 2 | 814208 | |
| R138 | 1Meg | | 814228 | |
| R139 | 390K | | 814223 | |
| R140 | 10K 5% | 10 | 525175 | |
| R141 | 1.5Meg | | 814230 | |
| R142 | 68000 | 7 | 524467 | |
| R143 | 6000Ω 5% | | 814086 | |
| R144 | 6800Ω | | 814202 | |
| R145 | 82K | | 814187 | |
| R146 | 1Meg | | 814228 | |
| R147 | 10Meg | | 814240 | |
| R148 | 8800Ω | 7 | 534467 | |
| R149 | 680K | | 814225 | |
| R150 | 330Ω | | 814185 | |
| R151 | 560Ω 5% | | 814097 | |
| R152 | 100Ω | | 814180 | |
| R153 | 22K | 2 | 814208 | |
| R154 | 2700Ω 5% | | 814049 | |
| R155 | 390Ω 5% | | 814053 | |
| R156 | 270Ω | | 814185 | |
| R157 | 5800Ω 5% | | 814091 | |
| R158 | 470Ω 5% | | 814085 | |
| R159 | 1Meg | | 814228 | |
| R160 | 330K | | 814223 | |
| R161 | 10K 5% | 10 | 525175 | |
| R162 | 1.5Meg | | 814230 | |
| R163 | 3900 5% | 2 | 814053 | |
| R164 | 1Meg | | 814228 | |
| R165 | 2.2Meg | | 814232 | |
| R166 | 470K | | 814224 | |
| R167 | 470K | | 814224 | |
| R168 | 10Meg | | 814240 | |
| R169 | 56K 5% | | 814105 | |
| R170 | 1000Ω | | 814192 | |
| R171 | 3300Ω | | 814193 | |
| R172 | 68K | | 814214 | |
| R173 | 1000Ω | | 814192 | |
| R174 | 47K | 1 | 814219 | |
| R175 | 9800Ω 5% | | 814093 | |
| R176 | 3300Ω 5% | | 814075 | |
| R177 | 5600Ω 5% | | 814081 | |
| R178 | 1000 | | 814180 | |
| R179 | 470Ω 5% | | 814055 | |
| R180 | 56Ω | | 814177 | |
| R181 | 56000Ω 5% | | 814091 | |
| R182 | 1Meg | | 814228 | |
| R183 | 390K | | 814223 | |
| R184 | 10K 5% | 10 | 525175 | |
| R185 | 1.5Meg | | 814230 | |
| R186 | 120K 5% | 2 | 814115 | |
| R187 | 27K 5% | | 814097 | |
| R188 | 100K | 2 | 814216 | |
| R189 | 100K | 2 | 814216 | |
| R190 | 100K | 2 | 814216 | |
| R191 | 10K | | 814204 | |
| R192 | 22Ω | 2 | 814172 | |

## RESISTORS (cont)

| ITEM No | RATING OHMS | RATING WATT | HOFFMAN Part No | NOTES |
|---|---|---|---|---|
| R193 | 22Ω | 2 | 814172 | |
| R194 | 27Ω | 2 | 814173 | |
| R195 | 82Ω | 2 | 814179 | |
| R196 | 470Ω | 2 | 814188 | |
| R197 | 2700Ω | 7 | 534445 | |
| R198 | 82Ω | 1 | 814186 | |

| ITEM No | RATING OHMS | RATING WATT | HOFFMAN Part No | NOTES |
|---|---|---|---|---|
| R199 | 2700Ω | 7 | 534445 | |
| R200 | 1500Ω | 10 | 625433 | |
| R201 | 18000 | 10 | 625434 | |
| R202 | 10K | 1 | 816231 | |
| R203 | 56K | | 814213 | |
| R204 | 56K | | 814213 | |

## TRANSFORMER (POWER)

| ITEM No. | RATING PRI | RATING SEC. 1 | RATING SEC. 2 | RATING SEC. 3 | REPLACEMENT DATA HOFFMAN Part No | Halldorson Part No | Merit Part No | Stancor Part No | Thordarson Part No | Triad Part No | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|---|
| T1 | 117V @ 3.9A | 665VCT @ 455A | 5V @ 6A | 6.3V @ 2A<br>SEC. 4<br>6.3V @ 14A | T16001 | | | | | | |

## TRANSFORMERS (SWEEP CIRCUITS)

| ITEM No. | USE | REPLACEMENT DATA HOFFMAN Part No. | Halldorson Part No. | Merit Part No | Ram Part No. | Stancor Part No. | Thordarson Part No | Triad Part No | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| T2 | Vert. Output | T28001 | | | | | | | |
| T3A | Yoke-Horiz (12MH) | T28001 | 1 | | | | | | |
| B | Vert (12MH) | | | | | | | | |
| T4 | Horiz. Output | T82001 | | | | | | | |
| T5 | Horiz. Lin. Coil (.34-1.2MH) | T66001 | | | | | | | |
| T6 | Width Choke (.36MH) | T78001 | | | | | | | |
| T7 | Green Horiz. Amp. Coil (.18-1.5MH) | T56001 | RF803 | MWC-10 ② | 20LR4 | WC-7 | WC-16 | | |
| T8 | Blue Horiz. Amp. Coil (.18-1.5MH) | T56001 | RF803 | MWC-10 ② | 20LR4 | WC-7 | WC-16 | | |
| T9 | Red Horiz. Amp. Coil (.18-1.5MH) | T56001 | RF803 | MWC-10 ② | 20LR4 | WC-7 | WC-16 | | |
| T10 | Green Horiz. Tilt Coil (.11-.47MH) | T56003 | | MWC-15 | | | | WLC-4 | |
| T11 | Blue Horiz. Tilt Coil (.11-.47MH) | T56002 | | MWC-15 | | | | WLC-4 | |
| T12 | Red Horiz. Tilt Coil (.11-.47MH) | T56002 | | MWC-15 | | | | WLC-4 | |
| T15 | Convergence Yoke | T84001 | | | | | | | |

① Includes resistors R109, R110 and capacitor C103.
② Used red and blue terminals.

## TRANSFORMER (AUDIO OUTPUT)

| ITEM No. | IMPEDANCE PRI | IMPEDANCE SEC | REPLACEMENT DATA HOFFMAN Part No. | Halldorson Part No. | Merit Part No. | Stancor Part No. | Thordarson Part No | Triad Part No | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| T14 | 10K | 6-8Ω tap at 3-4Ω | T84005 | 21404 ① | A-3021 ① | A-5321 ① | 34856 ① | S-28X ② | ① Tape center tap on primary winding<br>② Drill new mounting hole. |

## SPEAKER

| ITEM No. | TYPE SIZE | TYPE FIELD | TYPE V. C. IMP. | REPLACEMENT DATA HOFFMAN Part No. | QUAM Part No. | NOTES |
|---|---|---|---|---|---|---|
| SP1 | 5 1/4" | PM | 3-4Ω | 708201 ① ② | 52A1 ① | ① Phase |
| SP2 | 3 1/4" | PM | 3-4Ω | 708202 ① ② | 52A1 ① | ② Used in Models B404L, U, B405L, U, M404L, U, M405L, U, SP2021, U, SP4021, U, SP4061, U |
| SP3 | 6" x 11" | PM | 3-4Ω | 708901 ③ | | ③ Used in Models B405L, U, M405L, U, SP4061, U |
| | 6" | PM | | 708601 ③ | | ④ Used in Models B303L, U, M303L, U, SP2021, U, B404L, U, M404L, U, SP4041, U |

## COILS (RF-IF)

| ITEM No. | USE | REPLACEMENT DATA HOFFMAN Part No. | MEISSNER Part No. | MERIT Part No. | MILLER Part No. | NOTES |
|---|---|---|---|---|---|---|
| L1 | RF Coil | T50003 | 19-1000 | BC-561 | 4602 | 1 Microhenries |
| L2 | 41.25MC Trap | T80001 | | | | |
| L3 | 47.25MC Trap | T80002 | | | | |
| L4 | 1st. Video IF | T62002 | | | | |
| L5 | Fil. Choke | | | | | |
| L6 | 2nd. Video IF | T60001 | | | | |
| L7 | Fil. Choke | | | | | |
| L8 | 3rd. Video IF | T62001 | | | | |
| L9 | 4th. Video IF | T80003 | | | | Includes 41.25MC Trap |
| L10 | Series Peaking Coil | | 19-4060 | | 6110 | 82 Microhenries |
| L11 | Shunt Peaking Coil | T77028 | 19-3180 | TV-184 | 6180 | 180 Microhenries |
| L12 | RF Choke | T50001 | | | | 12 Microhenries |
| L13 | RF Choke | T50001 | | | | 13 Microhenries |
| L14 | Series Peaking Coil | T77027 | 19-3180 * | TV-184 | 6180 * | 180 Microhenries, wound on 1000Ω resistor |
| L15 | Shunt Peaking Coil | T77101 | 19-3180 ■ | TV-184 ■ | 6180 ■ | 180 Microhenries, wound on 1Meg resistor |
| L16 | Series Peaking Coil | T77028 | 19-3180 ▲ | TV-184 | 6180 ▲ | 180 Microhenries, wound on 82000 resistor |
| L17 | Series Peaking Coil | T77029 | 19-3300 ■ | | 6155 ■ | 300 Microhenries, wound on 1Meg resistor |
| L18 | Shunt Peaking Coil | T77009 | 19-3135 ■ | TV-195 | 6153 ■ | 130 Microhenries, wound on 1Meg resistor |
| L19 | RF Choke | T50001 | | | | 12 Microhenries |
| L20 | RF Choke | T50001 | | | | 12 Microhenries |
| L21 | 1st. Sound IF | T60009 | | | | Includes 27mmf Cap. |
| L22 | 2nd. Sound IF | T60010 | | | | Includes 39mmf Cap. |
| L23 | Ratio Det. | T74003 | | | | Tertiary winding - 7Ω |
| L24 | RF Choke | T50001 | | | | 13 Microhenries |
| L25 | Chroma Take-off Trans. | T54001 | | | | Includes 4.5MC Trap |
| L26 | Low Freq. Peaking Coil | T54003 | | | | |
| L27 | 1st. Bandpass Trans. | T54004 | | | | Tertiary winding - 4.4Ω |
| L28 | 2nd. Bandpass Trans. | T54005 | | | | |
| L29 | Burst Amp. Trans. | T54006 | | | | Includes 1.5mmf & 47mmf Caps. |
| L30 | Demod. Driver Trans. | T54007 | | | | Tertiary winding - 3Ω |
| L31 | Chroma Reference Osc. Coil | T68008 | | | | |

HOFFMAN MODELS B2021, U, B4061, U, M2021, U, M4041, U, M4061, U, SP2021, U, SP4041, U, SP4061, U (Ch. 706, U)

FOLDER 3

# PARTS LIST AND DESCRIPTIONS (Continued)

## COILS (cont)

| ITEM No. | USE | REPLACEMENT DATA | | | | NOTES |
|---|---|---|---|---|---|---|
| | | HOFFMAN PART No. | MEISSNER PART No. | MERIT PART No. | MILLER PART No. | |
| L32 | Shunt Peaking Coil | 771031 | 19-3180 | TV-184 | 6180 | 180 Microhenries |
| L33 | Series Peaking Coil | 771023 | 19-3660 | TV-205 | 6146 | 620 Microhenries |
| L34 | Shunt Peaking Coil | 771031 | 19-3180 | TV-184 | 6180 | 180 Microhenries |
| L35 | Series Peaking Coil | 771023 | 19-3660 | TV-205 | 6146 | 620 Microhenries |
| L36 | Shunt Peaking Coil | 771024 | | BC-513 | | 1100 Microhenries |
| L37 | Shunt Peaking Coil | 771024 | | BC-513 | | 1100 Microhenries |
| L38 | Shunt Peaking Coil | 771024 | | BC-513 | | 1100 Microhenries |
| L39 | RF Choke | 750001 | | | | 12 Microhenries |
| L40 | RF Choke | 750001 | | | | 12 Microhenries |

* Parallel with 1800Ω resistor.
■ Parallel with 1Meg resistor.
▲ Parallel with 8200Ω resistor.

## TRANSFORMER (HORIZ. OSC.)

| ITEM No. | DC RES. | | REPLACEMENT DATA | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | PRI. | SEC. | HOFFMAN PART No. | Meissner PART No. | Merit PART No. | Miller PART No. | Ram PART No. | Thordarson PART No. | |
| L41 | 80Ω | | 768001 | | TV-165 | 6211 | | HS-7 | Tapped @ 57Ω Horiz. Freq. Waveform |
| L42 | 46Ω | | 768007 | | | | | | |

## FILTER CHOKE

| ITEM No. | RATINGS | | | REPLACEMENT DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | TOTAL DIRECT CURRENT | D. C. RESISTANCE | INDUCTANCE (0 CURRENT 1000 ∿) | HOFFMAN PART No. | Halldorson PART No. | Merit PART No. | Stancor PART No. | Thordarson PART No. | Triad PART No. |
| L43 | .455A | 41Ω | .54 Hy. | 734001 | | | | | C-40X ① |

① Drill new mounting hole.

## FUSES

| ITEM No. | TYPE | RATING | REPLACEMENT DATA | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | HOFFMAN PART No. | | LITTELFUSE PART No. | | BUSS PART No. | |
| | | | FUSE | HOLDER | FUSE | HOLDER | FUSE | HOLDER |
| M1 | 3½" | Length | of #22 wire. | | | | | |
| M2 | 3AG | 2A - 250V P/T | 954309 | | 318002. (3AG-2A-250V P/T) | | GJV 2 | |
| M3 | C | 3/4A - 250V | 954009 | | 332.750 (C 3/4A) | 346003 | C 3/4A | HC - 1/2 to 3/4 |
| M4 | C | 3/10A - 250V | 954006 | | 332.300 (C 3/10A) | 346001 | C 3/10A | HC - 0 to 3/10 |

## CRYSTAL DIODES

| ITEM No. | ORIG. TYPE | REPLACEMENT DATA | | | NOTES |
|---|---|---|---|---|---|
| | | HOFFMAN PART No. | CBS PART No. | SYLVANIA PART No. | |
| M5 | K60 | 742003 | 1N60 | 1N60 | Video Det. (Pigtail) |
| M6 | K60 | 742003 | 1N60 | 1N60 | Sound Det. (Pigtail) |
| M7 | K60 | 742003 | 1N60 | 1N60 | Color Killer Bias (Pigtail) |

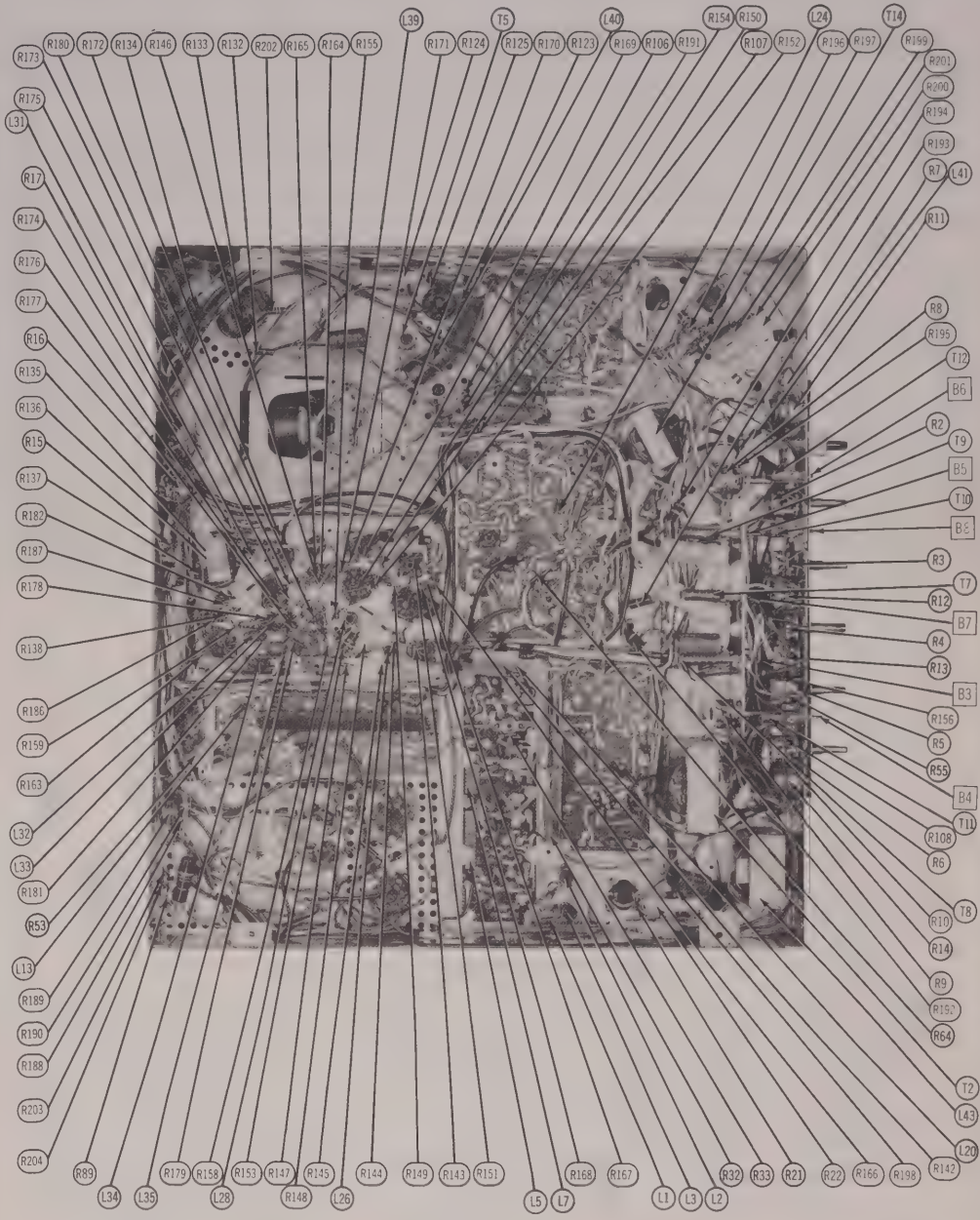
## MISCELLANEOUS

| ITEM No. | PART NAME | HOFFMAN PART No. | NOTES |
|---|---|---|---|
| M8 | Crystal | 936001 | 3.579545MC |
| M9 | Tuner | 710005 | VHF - Ch. 706 |
| | Tuner | 712003 | UHF-VHF - Ch. 706U |
| M10 | Delay Line | 938001 | |
| M11 | Switch | 902001 | Width - Rotary, wafer type |
| M12 | Switch | 904001 | TV-Phono (Slide Type DPDT) |
| M13 | Switch | 904002 | Sync Lock (Slide Type SPDT) |
| M14 | Purity Magnet | 974001 | |
| M15 | Blue Lateral Magnet Assy. | 972001 | |
| M16 | Equalizing Magnet Assy. | 974004 | |

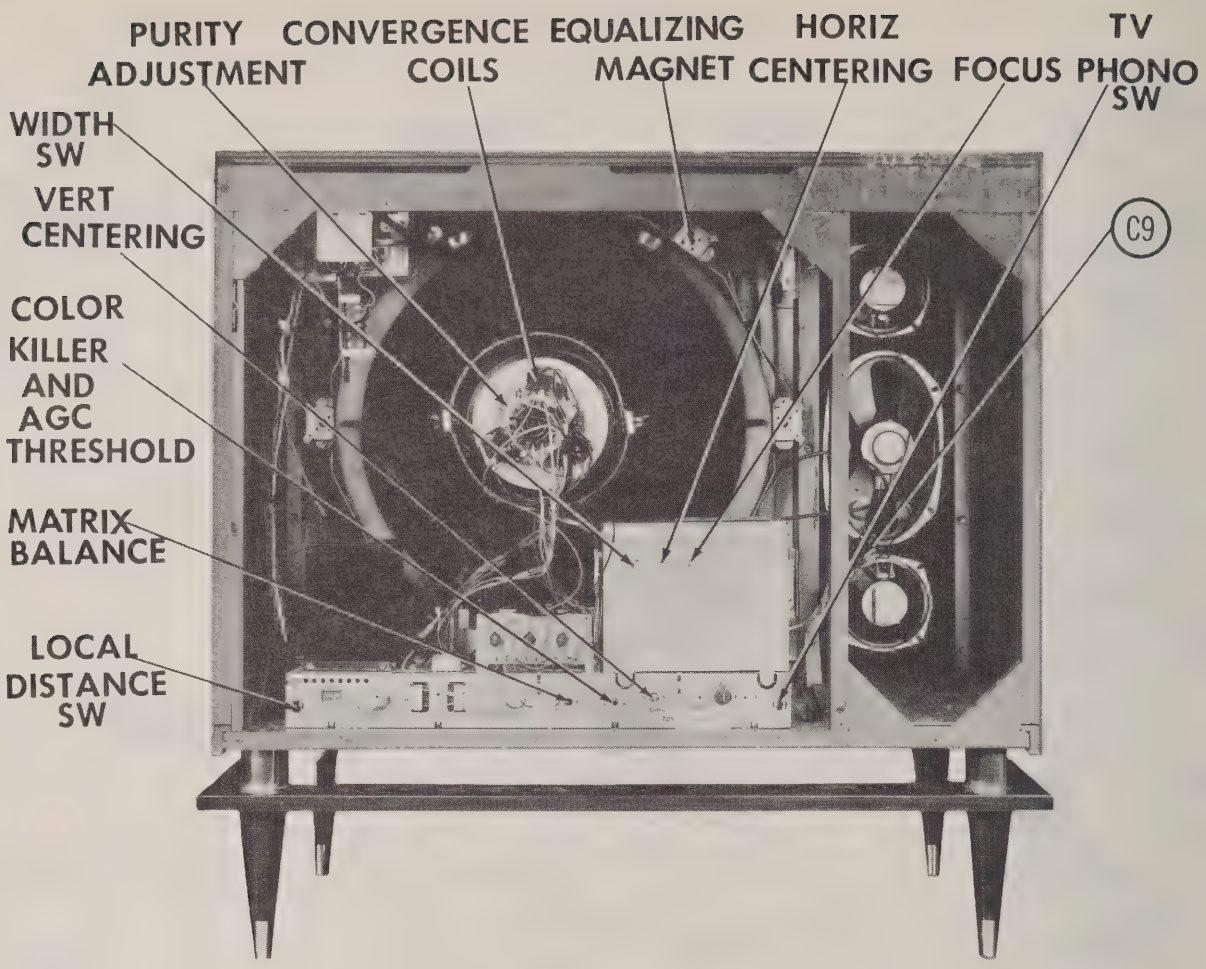
## CABINETS & CABINET PARTS

**(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)**

| NAME | PART NO. | DESCRIPTION |
|---|---|---|
| Safety Glass | 428001 | |
| Mask | 408001 | |
| Knob | 480002 | VHF Channel Selector - Models B2021, B4041, B4061 |
| Knob | 480001 | VHF Channel Selector - Models M2021, M4041, M4061 |
| Knob | 480003 | VHF Channel Selector - Models SP2021, SP4041, SP4061 |
| Knob | 496001 | VHF Fine Tuning - All VHF models |
| Knob | 480005 | UHF Channel Selector - Models B2021U, B4041U, B4061U |
| Knob | 480004 | UHF Channel Selector - Models M2021U, M4041U, M4061U |
| Knob | 480006 | UHF Channel Selector - Models SP2021U, SP4041U, SP4061U |
| Knob | 480008 | VHF Channel Selector - Models B2021U, B4041U, B4061U |
| Knob | 480007 | VHF Channel Selector - Models M2021U, M4041U, M4061U |
| Knob | 480009 | VHF Channel Selector - Models SP2021U, SP4041U, SP4061U |
| Knob | 496002 | UHF Fine Tuning - All UHF Models |
| Knob | 512002 | Brightness - Models B2021, U, B4041, U, B4061, U |
| Knob | 512001 | Brightness - Models M2021, U, M4041, U, M4061, U |
| Knob | 512003 | Brightness - Models SP2021, U, SP4041, U, SP4061, U |
| Knob | 508007 | On-off-volume - Models B2021, U, B4041, U, B4061, U |
| Knob | 508001 | On-off-volume - Models M2021, U, M4041, U, M4061, U |
| Knob | 508003 | On-off-volume - Models SP2021, U, SP4041, U, SP4061, U |
| Knob | 500002 | Contrast-Tone |
| Knob | 500001 | Color hue-Color brilliance |




CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION




## CABINET—REAR VIEW

## DISASSEMBLY INSTRUCTIONS

SAFETY GLASS AND MASK REMOVAL

1. Remove 2 wood screws and 2 metal screws holding the rear cover. Remove the rea cover.

2. Remove 4 clips from inside the front of the cabinet holding the front trim.

3. At the top of the front control panel opening 2 hooks are accessible, Pull these hooks down to release the safety glass and trim. Remove the safety glass and trim.

CHASSIS REMOVAL

1. Remove 5 push-on type knobs from the front and 4 from the side.

2. Remove 2 wood screws and 2 metal screws holding the rear cover. Remove the rear cover.

3. Remove 3 metal screws holding the on-off-volume and brightness control assembly. Remove the control.

4. Remove tuner plug, picture tube socket, convergence , yoke plug, yoke plug, speaker leads and the HV connector from the HV rectifier socket.

5. Remove 4 chassis bolts from the bottom.

6. Remove the chassis.

7. Remove 2 wood screws holding the antenna terminal board.

8. Remove 2 metal screws holding the tuner.

9. Remove the tuner.

PICTURE TUBE REMOVAL

1. Remove the chassis.

2. Place cabinet face down on a pad.

3. Remove the blue lateral magnet, the purity magnet and the convergence yoke assembly.

4. Remove 4 hex nuts holding the picture tube mounting brackets to the front mask. Move the brackets upward and out through holes in the equalizing magnet assembly.

5. Remove the springs and rubber cushions under the brackets.

6. Remove the yoke and picture tube shield.

7. Remove the picture tube.

8. Remove the insulator ring from the picture tube flange and remove the HV clip.

PHOTOFACT* Folder
*TRADE MARK
EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

# ZENITH MODELS Z2229RZ, RZU, Z2230EZ, EZU, RZ, RZU, Z2257EZ, EZU, MZ, MZU, RZ, RZU, Z3010EZ, HZ, RZ, YZ (Ch. 19Z32, U, Q)

## DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 7 push-on type knobs from the front, 1 from the back.

2. Remove 4 metal screws holding the rear cover. Remove the rear cover.

3. Remove 2 plugs from the tuner and the speaker leads.

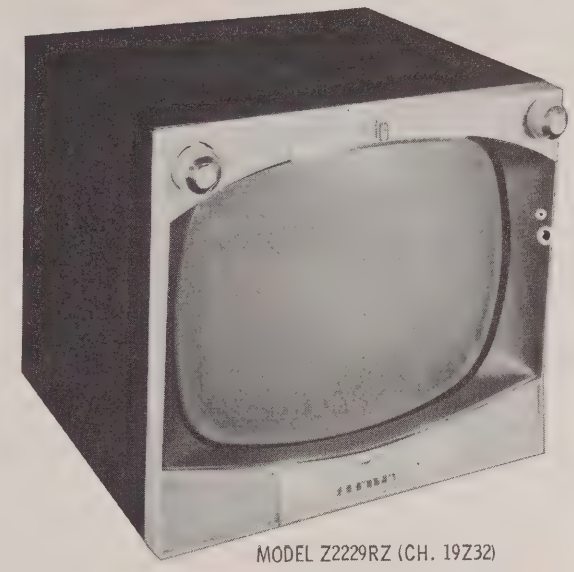
4. Remove 2 metal screws from the rear tuner brace. Remove the tuner by pulling back.

5. Remove 4 hex nuts holding the speaker. Remove the speaker.

6. Remove the hex nut from the on-off-volume control and remove the control.

7. Remove 4 chassis bolts from the bottom.

8. Remove the chassis.



MODEL Z2229RZ (CH. 19Z32)

| TRADE NAME | Zenith | MODELS | CHASSIS |
|---|---|---|---|
| | | Z2229RZ, Z2230EZ, RZ, Z2257EZ, MZ, RZ ..... | 19Z32 |
| | | Z2229RZU, Z2230EZU, RZU, Z2257EZU, MZU, RZU ..... | 19Z32U |
| | | Z3010EZ, HZ, RZ, YZ ..... | 19Z32Q |
| MANUFACTURER | Zenith Radio Corp., 6001 Dickens Ave., Chicago 39, Illinois | | |
| TYPE SET | Television Receiver | | |
| TUBES | Nineteen | | |
| POWER SUPPLY | 110-120 Volts AC, 60 Cycle | RATING 185 Watts, 1.6 Amp. @ 117 Volts AC | |
| TUNING RANGE | Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier) | | |

## SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

To touch-up the adjustment of the VHF oscillator set the fine tuning to the center of its range. The adjustments are accessible, one at a time, thru a hole in the rear of the tuner as the channel selector is rotated. Adjust for best picture and sound.

PICTURE TUBE SAFETY GLASS CLEANING

To remove the safety glass turn the crest at the top 1/4 turn counter clockwise to release the top trim plate. Remove the trim plate. Tilt the top of the glass out and lift up. NOTE: Exercise caution to not break the lower lip of the safety glass.

SPECIAL ADJUSTMENTS

A. AGC
Observe the picture and advance the AGC control to a point where the picture distorts or a buzz is heard in the sound. Back off from this setting until the picture becomes stable with no noise in the sound.

B. Focus
The focus may be varied by means of a focus control. (For location, see tube placement chart).

C. Fringe Lock
Turn the fringe lock control fully clockwise, then counter clockwise approximately 1/4 turn. Adjust picture to lock in with hold controls. If picture jitters, tears, etc. adjust fringe lock counter clockwise until stable. Readjust hold controls and check operation on all channels in the area.

D. Width
The width may be varied by means of a metallic sleeve located between the yoke and the picture tube neck. Adjust sleeve in or out of the yoke for a picture SLIGHTLY larger than necessary to fill the screen.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENTS

The horizontal frequency coil is used as the horizontal hold control. Adjust the horizontal hold until the picture synchronizes horizontally. (For location, see tube placement chart).

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate audio detector buzz, adjust the buzz control for MINIMUM buzz and maximum sound. (For location, see tube placement chart).

FUSES

One fuse is used for horizontal sweep circuit protection. (For location, see tube placement chart).

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube. Rotate the two rings around the neck of the tube until the picture is properly centered.

PROPERTY OF

ZENITH MODELS Z2229RZ, RZU, Z2230EZ, EZU, RZ, RZU, Z2257EZ, EZU, MZ, MZU, RZ, RZU, Z3010EZ, HZ, RZ, YZ (Ch. 19Z32, U, Q)

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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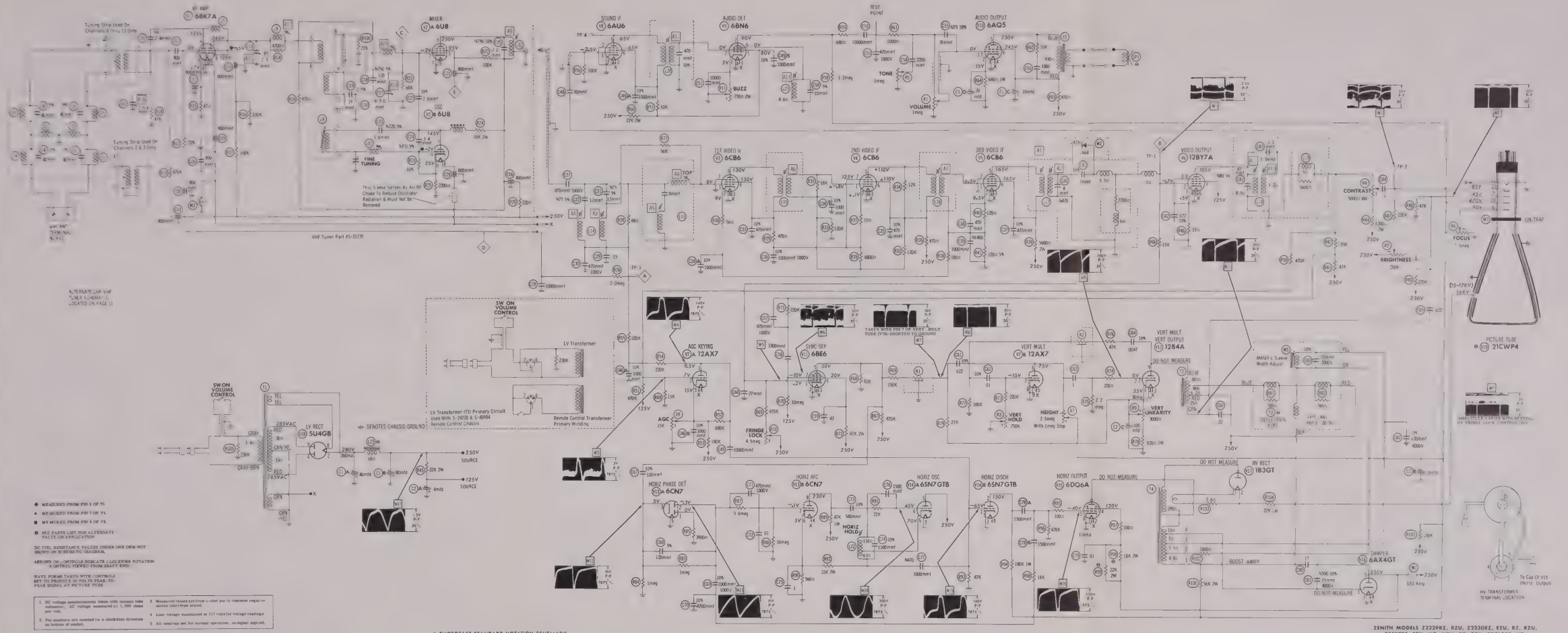
H274



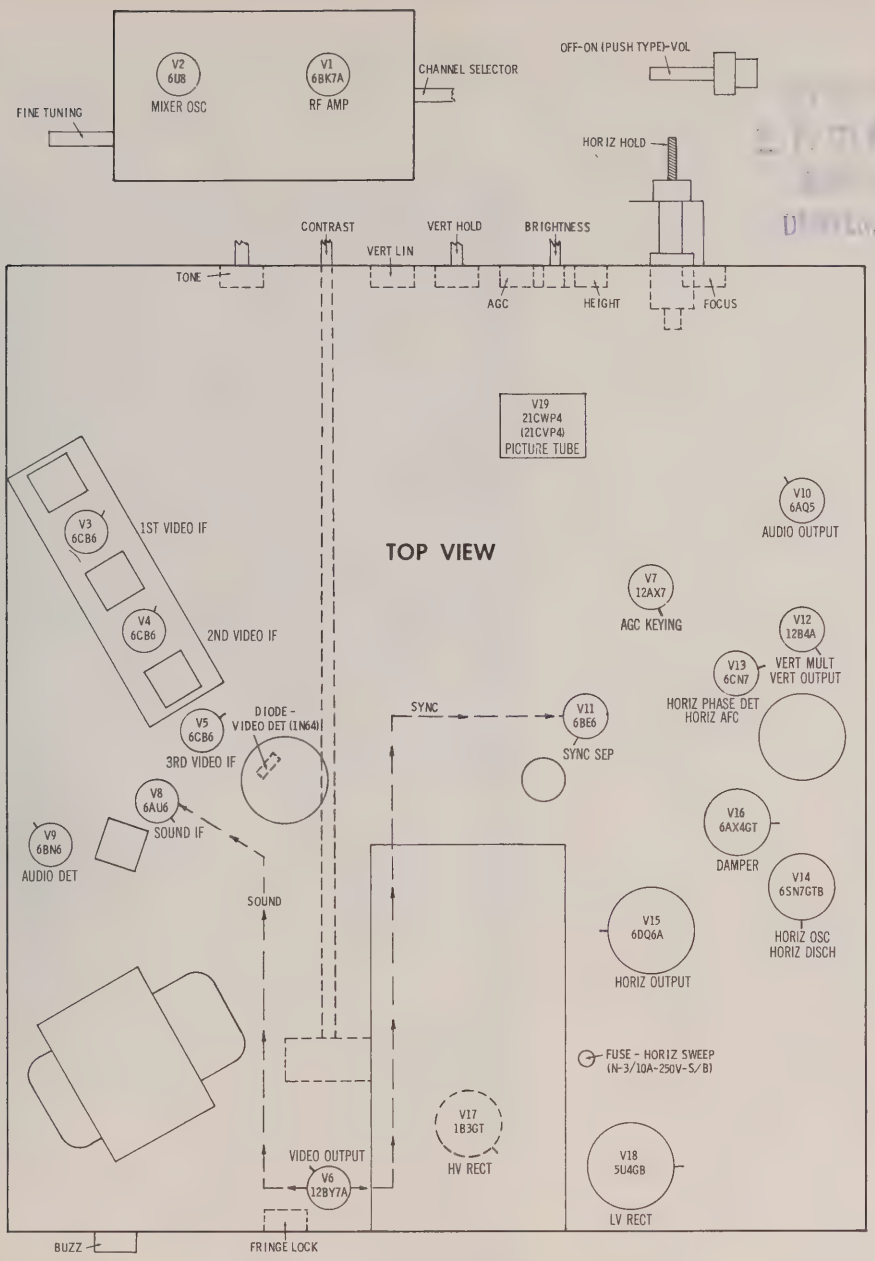
FOLDER 4


RF AMP V1 6BK7A
MIXER V2A 6U8
OSC V2B 6U8
SOUND IF V6 6AU6
AUDIO DET V3 6BN6
AUDIO OUTPUT V10 6AQ5
1ST VIDEO IF V2 6CB6
2ND VIDEO IF V4 6CB6
3RD VIDEO IF V5 6CB6
VIDEO OUTPUT V6 12BY7A
AGC KEYING V7A 12AX7
SYNC SEP V11 6BE6
VERT MULT V7B 12AX7
VERT MULT VERT OUTPUT V12 12B4A
HORIZ PHASE DET V13A 6CN7
HORIZ AFC V13B 6CN7
HORIZ OSC V14A 6SN7GTB
HORIZ DISCH V14B 6SN7GTB
HORIZ OUTPUT V15 6DQ6A
LV RECT V18 5U4GB
HV RECT V17 1B3GT
DAMPER V16 6AX4GT
PICTURE TUBE V19 21CWP4
TEST POINT
VOLUME 1meg
TONE 1meg
BUZZ
FINE TUNING
CONTRAST 500Ω 4W
BRIGHTNESS 250K
FOCUS 5meg
VERT LINEARITY 3000Ω
VERT HOLD 150K
HEIGHT 7.5meg With 1meg Stop
HORIZ HOLD
FRINGE LOCK 4.7meg
AGC 15K
ION TRAP
BOOST 680Ω
DO NOT MEASURE
SW ON VOLUME CONTROL
LV Transformer
Remote Control Transformer Primary Winding
LV Transformer (T3) Primary Circuit Used With S-24720 & S-40984 Remote Control Chassis
DENOTES CHASSIS GROUND
VHF Tuner Part #5-21735
Tuning Strip Used On Channels 4 Thru 13 Only
Tuning Strip Used On Channels 2 & 3 Only
This Sleeve Serves As An RF Choke To Reduce Oscillator Radiation & Must Not Be Removed
ALTERNATE UHF-VHF TUNER SCHEMATIC LOCATED ON PAGE 11
285VAC
280V 260mA
785VAC
250V SOURCE
125V SOURCE
◆ MEASURED FROM PIN 3 OF V1
▲ MEASURED FROM PIN 7 OF V4
■ MEASURED FROM PIN 8 OF V2
● SEE PARTS LIST FOR ALTERNATE VALUES OR APPLICATION
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM.
ARROWS ON ⟳ CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END).
WAVE FORMS TAKEN WITH CONTROLS SET TO PRODUCE 50 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE
1. DC voltage measurements taken with vacuum tube voltmeter, AC voltage measured at 1,000 ohms per volt.
2. Pin numbers are counted in a clockwise direction on bottom of socket.
3. Measured values are from a chart pen to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings.
5. All controls set for normal operation, no signal applied.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
Howard W. Sams & Co., Inc. 1958

ZENITH MODELS Z2229RZ, RZU, Z2230EZ, EZU, RZ, RZU, Z2257EZ, EZU, MZ, MZU, RZ, RZU, Z3010EZ, HZ, Z3016RZ, YZ (Ch. 19233, U, Q)

# TUBE PLACEMENT CHART




# TUBE FAILURE CHECK CHART

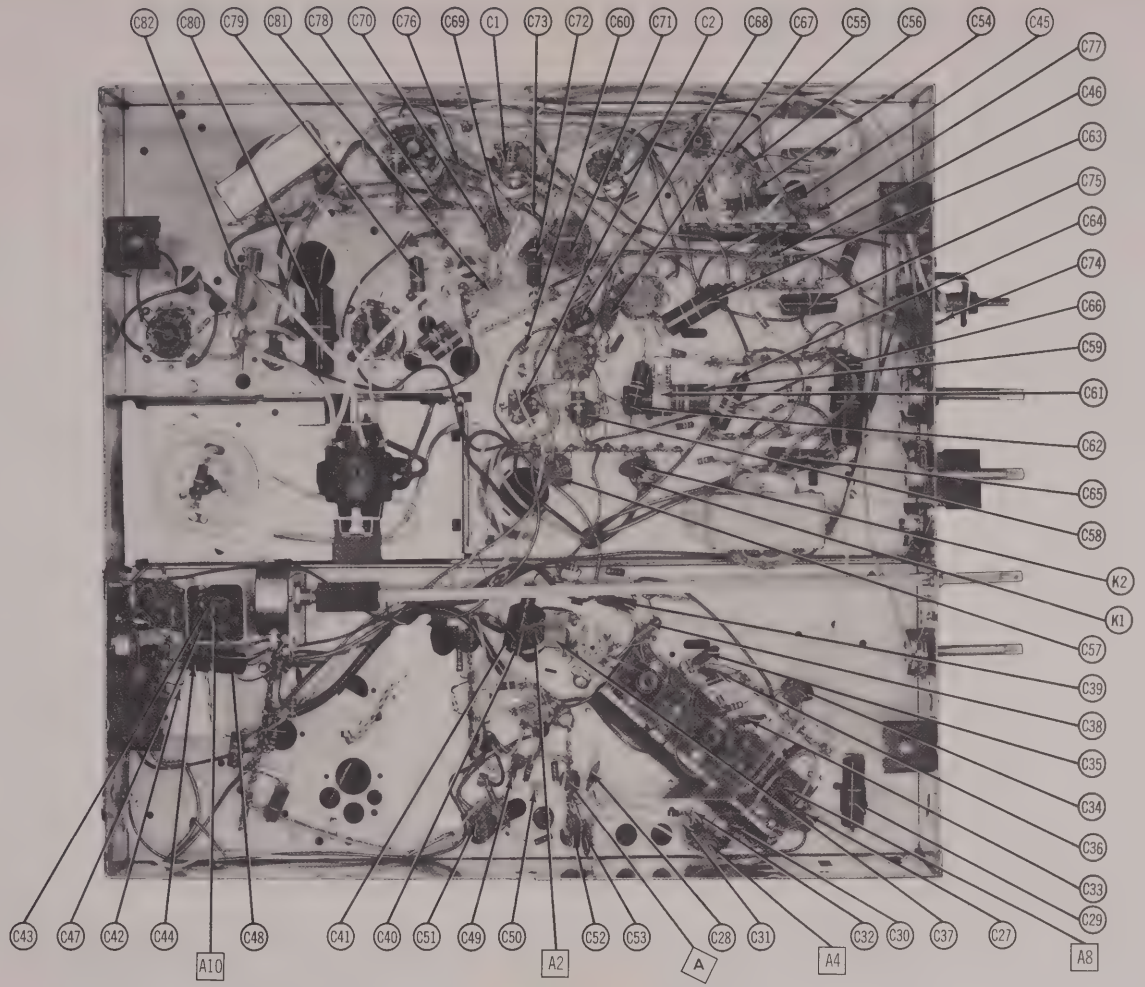
The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - **V18**

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V3, V4, V5, Diode (M2), V6**
No pic, no sound, has snow - **V1, V2, V3**
No pic, has sound, has raster - **V6, V19**
Has pic, no sound - **V8, V9, V10**
Overloaded picture - **V7**

SYNC FAILURE
No vert. sync - **V11**
No horiz. sync - **V11, V13**
No vert. or horiz. sync - **V11**

SWEEP FAILURE
No raster, has sound - **V13, V14, V15, V16, V17, V19**
No vertical deflection - **V7, V12**
Poor vert. linearity or foldover - **V7, V12**
Poor horiz. linearity or foldover - **V14, V15, V16**
Narrow picture - **V14, V15, V16, V18**
Vert. off freq. - **V7, V12**
Horiz. off freq. - **V14**




CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION

# ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

Allow a 20 minute warm-up period for the receiver and test equipment.

VIDEO IF ALIGNMENT

Connect the negative lead of a bias supply that may be varied from negative 3 volts to positive 3 volts to point Ⓐ. Common to chassis.
Use only enough signal input to provide no more than 3 volts peak to peak output on the scope with bias adjusted for -2 volts at point Ⓐ.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide a usable pattern on scope.

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 1. | 470mmf | High side to pin 1 (grid) of 6CB6 (V5). Low side to chassis. | 43.5MC (10MC Swp) | 39.75MC 45.75MC | Between any two channels | Vert. Amp. thru 10K to point Ⓑ. Low side to chassis. | A1, A2 | Adjust for maximum gain and symmetry of response similar to Fig. 1 with markers as shown. If proper response cannot be obtained, check to see that the two cores are entering their respective windings from opposite ends of the coils. |
| 2. | " | High side to point Ⓒ. Low side to chassis. | " | 47.25MC | " | " | A3 | Reduce bias and use maximum scope gain to observe trap notches. Adjust to place marker in trap notch. (See Fig. 2). |
| 3. | " | " | " | 39.75MC | " | " | A4 | " |
| 4. | " | " | " | 41.25MC | " | " | A5 | " |
| 5. | " | " | " | 41.25MC 45.0MC 45.75MC | " | " | A6, A7, A8, A9 | Readjust bias to -2 volts. Adjust for maximum gain and symmetry of response similar to Fig. 3 with markers as shown. A6 affects low frequency side of curve and A7 affects high frequency side. |

SOUND IF ALIGNMENT

Connect an attenuator (Zenith S-17203 or equivalent) in series with the antenna. Tune in a TV signal and adjust the attenuator until the signal is below the limiting level of the 6BN6 as evidenced by a hiss similar to super-regeneration in the sound. Adjust A10, A11, A12 and A13 for maximum sound,best quality. Adjust the buzz control (R11) for MINIMUM buzz. If the hiss disappears during the alignment, further reduce the signal until the hiss returns.

VHF OSCILLATOR ALIGNMENT

Set the fine tuning to the approximate center of its range. The oscillator adjustment screws are accessible one at a time thru the back of the tuner as the channel selector is rotated. Adjust for best picture and sound.

VHF RF AND MIXER ALIGNMENT

Connect the negative lead of a 2 volt bias supply to point Ⓓ.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
Use only enough sweep generator output to provide a usable pattern on scope.

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 6. | 50Ω to 300Ω Matching Trans. | Across VHF antenna terminals thru matching transformer. | 69MC (10MC Swp) | 67.25MC 71.75MC | 4 | Vert. Amp. thru 10K to point Ⓔ. Low side to chassis. | A14, A15, A16 | Adjust for maximum gain and symmetry of response similar to Fig. 4 with markers as shown. |
| 7. | " | " | 201MC (10MC Swp) | 199.25MC 203.75MC | 11 | " | A17, A18 | Adjust for maximum gain and symmetry of response similar to Fig. 4 with markers as shown. Repeat steps 6 and 7 until best overall symmetry is obtained. |

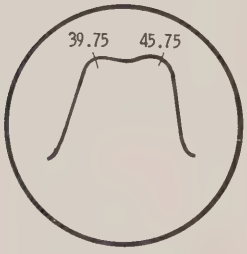


FIG.1

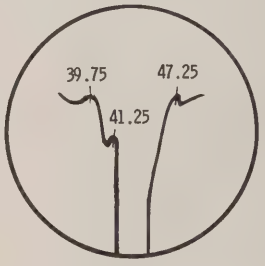


FIG.2

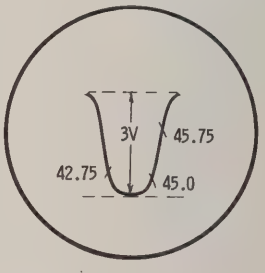


FIG.3

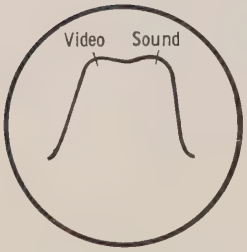


FIG.4

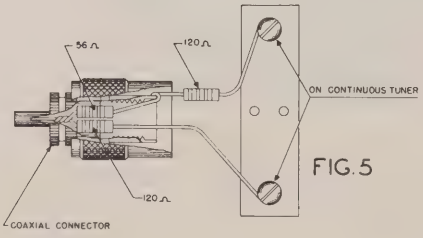


FIG.5

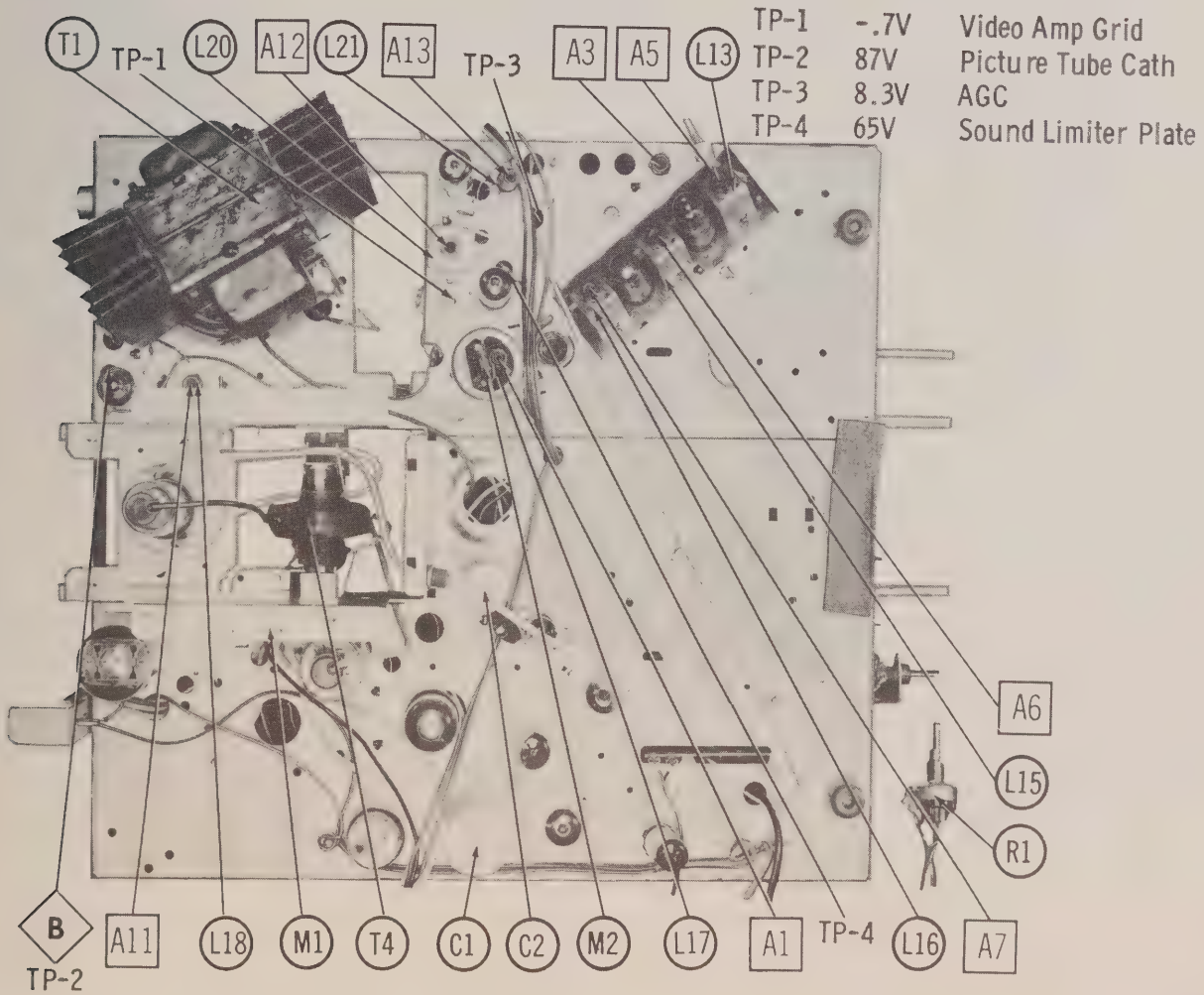
FIG.6

# ALIGNMENT INSTRUCTIONS (cont)

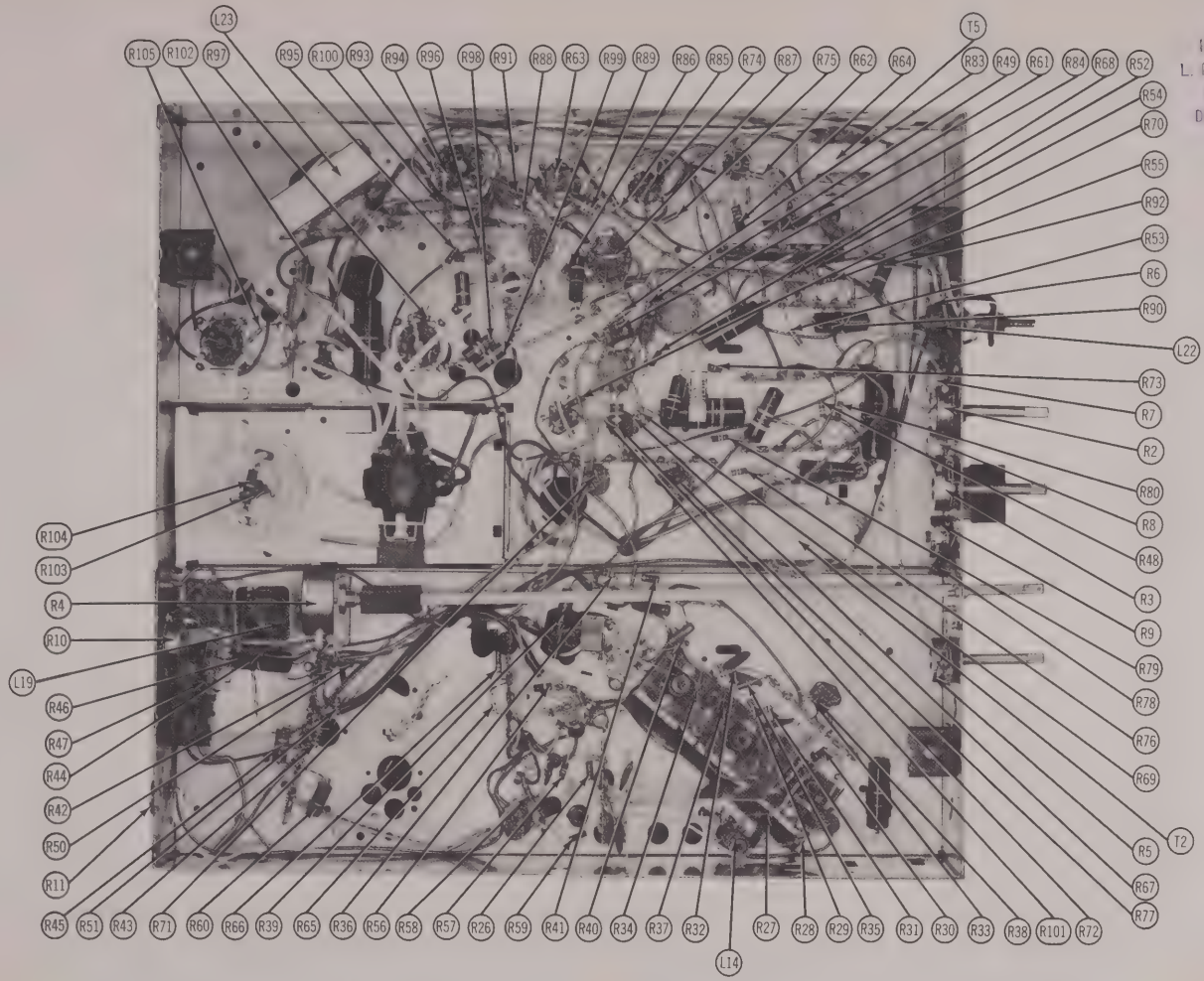
UHF TUNER ALIGNMENT

Alignment of the UHF tuner should not be attemped without the proper test equipment.
Connect the negative lead of a 2 volt bias supply to point Ⓐ. Positive to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
Use only enough sweep generator output to provide a usable pattern on scope.
Use 10MC sweep unless otherwise noted.

| | DUMMY ANTENNA | SWEEP GENERATOR COUPLING | SWEEP GENERATOR FREQUENCY | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 8. | Fig. 5 | Across UHF antenna terminals thru matching network (Fig. 5). | 713MC | 711.25MC | 54 | Vert. Amp. thru 10K to point Ⓑ. Low side to chassis. | A19, A20, A21 | With the UHF tuning knob set to channel 54, the rocker arm on the tuner should be in the horizontal position. If necessary, loosen set screw and turn the shaft independently of the pulley until the arm is in the horizontal position with the channel indicator on channel 54. Tighten the set screw. If the calibration is off more than 3 channels, adjust A19 to place video marker at 50% on curve as in Fig. 6. The image (weaker response) will appear also. The response toward counter clockwise position of A19 is the proper response. Adjust A20 and A21 for maximum amplitude of response similar to Fig. 6. |
| 9. | " | " | 473MC | 471.25MC | 14 | " | | Check for response similar to Fig. 5. If the oscillator is off more than 3 channels, adjust oscillator travel adjustment (osc., mixer and antenna travel adjustments are the three hex nuts on top of the UHF tuner next to the tuner chassis) to scale. Care must be used when making the adjustment so as not to move the rocker arm out of its bearing. Set the mixer and antenna travel adjustments for maximum response on scope. |
| 10. | " | " | 887MC | 885.25MC | 83 | " | A22, A23, A24 | Adjust A22 to place marker at 50% on curve similar to Fig. 6. Adjust A23 and A24 for maximum amplitude and symmetry. |




CHASSIS TOP VIEW

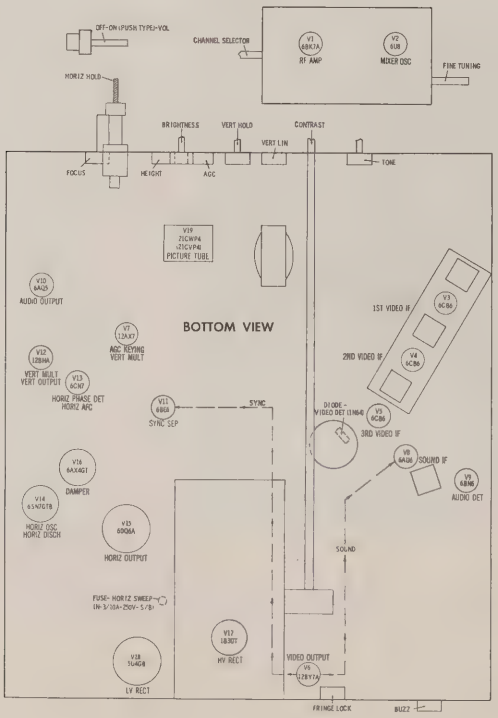



CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION

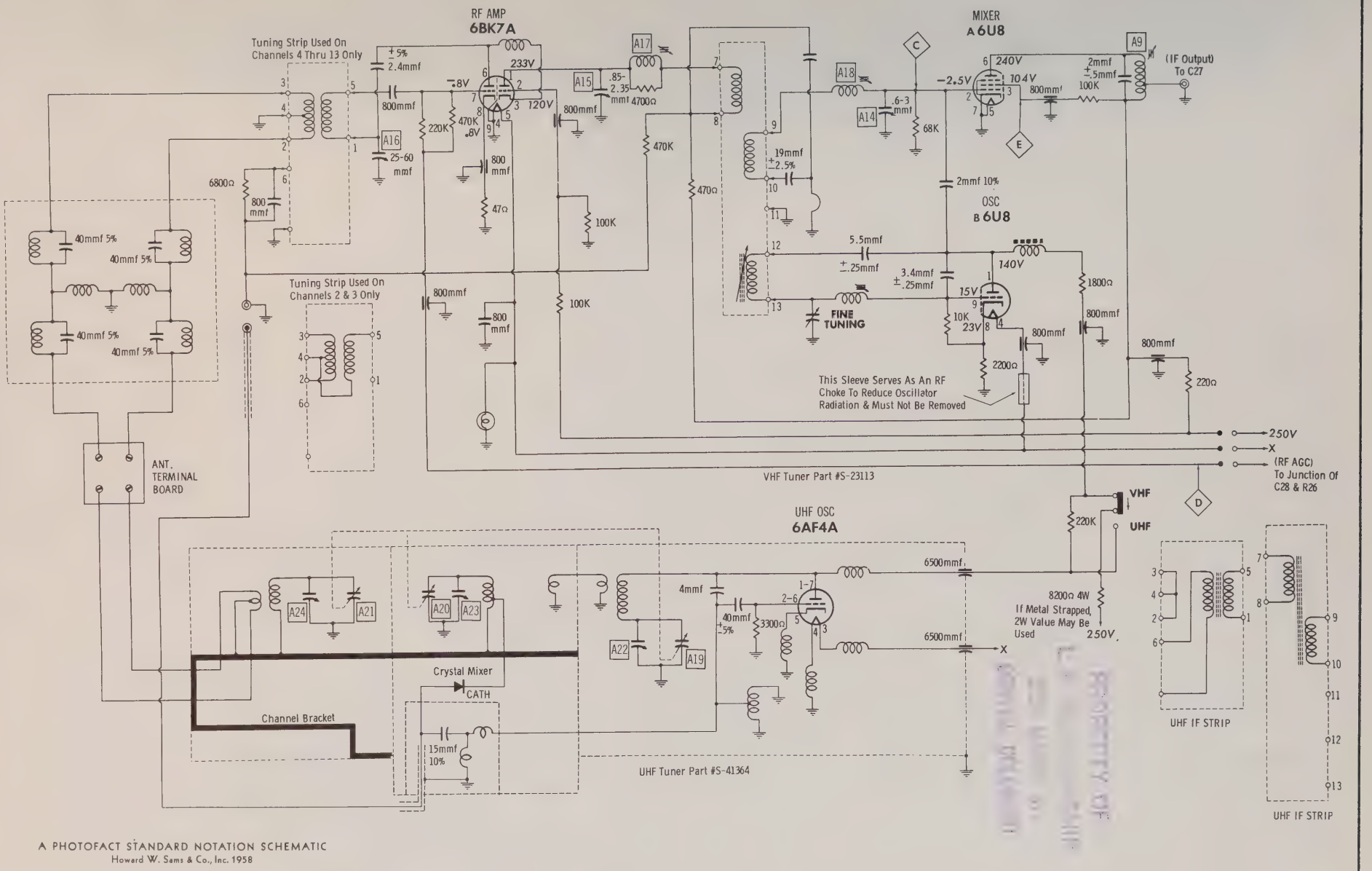
# RESISTANCE MEASUREMENTS

| ITEM | TUBE | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 | Pin 8 | Pin 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| V1 | 6BK7A | †690Ω | 50K | INF | 0Ω | .1Ω | INF | 3.2meg | 47Ω | 0Ω |
| V2 | 6U8 | †10K | 68K | †100K | .1Ω | 0Ω | †220Ω | 0Ω | 2200Ω | 12K |
| V3 | 6CB6 | 1.1meg | 450Ω | .1Ω | 0Ω | ▲ 470Ω | ▲ 470Ω | 0Ω | | |
| V4 | 6CB6 | ▲ 6800Ω | ▲ 15Ω | .1Ω | 0Ω | †470Ω | †470Ω | 60K | | |
| V5 | 6CB6 | 220Ω | 340Ω | .1Ω | 0Ω | †5600Ω | †5600Ω | 0Ω | | |
| V6 | 12BY7A | 15Ω | 2700Ω | 15Ω | 0Ω | 0Ω | .1Ω | †5800Ω | †22K | 15Ω |
| V7 | 12AX7 | †620K | 13K | 8000Ω | .1Ω | .1Ω | • ‡5meg | • 440K | 0Ω | 0Ω |
| V8 | 6AU6 | 100K | 0Ω | .1Ω | 0Ω | †32K | †32K | 0Ω | | |
| V9 | 6BN6 | • 230Ω | .2Ω | .1Ω | 0Ω | †22K | 4.6Ω | ‡1.2meg | | |
| V10 | 6AQ5 | 0Ω | 680Ω | 0Ω | .1Ω | †1300Ω | †470Ω | 0Ω | | |
| V11 | 6BE6 | 17K | 0Ω | .1Ω | 0Ω | †75K | †47K | 8meg | | |
| V12 | 12B4A | • 1100Ω | 2.2meg | .1Ω | 0Ω | 0Ω | TP | 2.2meg | NC | †385Ω |
| V13 | 6CN7 | 3900Ω | 1.5meg | 750K | .1Ω | 0Ω | 560Ω | 3.7meg | †47K | NC |
| V14 | 6SN7GTB | 47K | ‡235K | 0Ω | 32K | †0Ω | 10K | 0Ω | .1Ω | |
| V15 | 6DQ6A | NC | .1Ω | NC | †10K | 470K | TP | 0Ω | 0Ω | TOP CAP ‡9Ω |
| V16 | 6AX4GT | NC | NC | ¶ | NC | †0Ω | NC | 0Ω | .1Ω | |
| V17 | 1B3GT | | PINS | 1 THRU 8 | HAVE | INFINITE | RESISTANCE | | | TOP CAP ‡300Ω |
| V18 | 5U4GB | NC | ¶ | TP | 33Ω | NC | 30Ω | TP | ¶ | |
| V19 | 21CWP4 | 0Ω | 40K | PIN 6 • ‡1.2meg | PIN 10 ‡56K | PIN 11 • 270K | PIN 12 .1Ω | | | |

¶ THIS READING CAN VARY GREATLY, (10K MINIMUM), DUE TO THE CONDITION OF THE ELECTROLYTIC CAPACITOR CONNECTED IN THE ASSOCIATED CIRCUIT.
• THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.
▲ MEASURED FROM PIN 7 OF V4.
† MEASURED FROM 250V SOURCE.
‡ MEASURED FROM PIN 3 OF V16.
NC NO CONNECTION.
TP TIE POINT.




# TUBE PLACEMENT CHART




A PHOTOFACT STANDARD NOTATION SCHEMATIC
Howard W. Sams & Co., Inc. 1958

# ALTERNATE TUNER SCHEMATIC

## ZENITH MODELS Z2229RZ, RZU, Z2230EZ, EZU, RZ, RZU, Z2257EZ, EZU, MZ, MZU, RZ, RZU, Z3010EZ, HZ, Z3016RZ, YZ (Ch. 19Z32, U, Q)

# PARTS LIST AND DESCRIPTIONS

## TUBES ( GENERAL ELECTRIC, SYLVANIA)

| ITEM No | USE | TYPE | NOTES |
|---|---|---|---|
| V1 | RF Amplifier | 6BK7A | |
| V2 | Mixer-Osc | 6U8 | |
| V3 | 1st Video-IF Amp | 6CB6 | |
| V4 | 2nd Video-IF Amp | 6CB6 | |
| V5 | 3rd Video-IF Amp | 6CB6 | |
| V6 | Video Output | 12BY7A | |
| V7 | AGC Keying-Vert. Mult. | 12AX7 | |
| V8 | Sound IF Amp. | 6AU6 | |
| V9 | Audio Det. | 6BN6 | |
| V10 | Audio Output | 6AQ5 | |
| V11 | Sync Sep. | 6BE6 | |
| V12 | Vert. Mult.-Vert. Output | 12BA6 | |
| V13 | Horiz. Phase Det.- | | |
| | Horiz. AFC | 6CH7 | |
| V14 | Horiz. Osc.- | | |
| | Horiz. Discharge | 6BN7GTB | |
| V15 | Horiz. Output | 6DQ6A | |
| V16 | Damper | 6AX4GT | |
| V17 | HV Rectifier | 1B3GT | |
| V18 | L.V Rectifier | 5U4GB | |

## PICTURE TUBE

| ITEM No | REPLACEMENT DATA | | | NOTES |
|---|---|---|---|---|
| | ZENITH PART No. | GENERAL ELECTRIC PART No. | SYLVANIA PART No. | |
| V19 | 21CWP4 | | 21CWP4 | 1. Silver screen 95 |

## ELECTROLYTIC CAPACITORS

| ITEM No | RATING | | REPLACEMENT DATA | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | CAP. | VOLT | ZENITH PART No. | AEROVOX PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | PYRAMID PART No. | SANGAMO PART No. | SPRAGUE PART No. |
| C1A | 40 | 400 | 22-2547 | AFH4-57-40 | D64TT | FP378 TC83 | | Q-325 MT-0325 | TVL-4569 |
| B | 40 | 400 | | | | | | | |
| C | 40 | 400 | | | | | | | |
| D | 20 | 25 | | | | | | | |
| C2A | 4 | 350 | 22-2548 | AFH3-189-40 | C1448 | | | T-110 | TVL-3806.8 |
| B | 40 | 475 | | | | | | | |
| C | 100 | 50 | | | | | | | |

## FIXED CAPACITORS

**Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.**

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| | CAP. | VOLT | ZENITH PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | ERIE PART No. | MALLORY PART No. | SPRAGUE PART No. | |
| C3 | 60 | | 22-3521 | | | | | | | 5% |
| C4 | 60 | | 22-3511 | | | | | | | 5% |
| C5 | 60 | | 22-3531 | | | | | | | 5% |
| C6 | 60 | | 22-3511 | | | | | | | 5% |
| C7 | 800 | | 22-3531 | BPD-0008 | DD-801 | L10T8 | ED-0008 | | 5GA-T8 | |
| C8 | 800 | | 22-3577 | | | | | | | |
| C9 | 2.4 | | 22-3546 | | | | | | | 5% |
| C10 | 2.5-6 | | 22-2222 | | | | | | | |
| C11 | 800 | | 22-3577 | | | | | | | |
| C12 | 800 | | 22-3577 | | | | | | | |
| C13 | 800 | | 22-3577 | | | | | | | |
| C14 | .85- | | | | | | | | | |
| | 2.3 | | 22-3455 | | | | | | | |
| C15 | 800 | | 22-3531 | BPD-0008 | DD-801 | L10T8 | ED-0008 | | 5GA-T8 | |
| C16 | 800 | | 22-3577 | | | | | | | |
| C17 | .9-3.0 | | 22-2504 | | | | | | | |
| C18 | 120 | | 22-3515 | N750-S1 120 | TCN-120 | C10T13U | TCT-120 | | | N750 5% |
| C19 | 19 | | 22-3405 | | | | | | | 2.5% |
| C20 | 2.0 | | 22-3565 | | | | | | | N750 10% |
| C21 | 800 | | 22-3577 | | | | | | | |
| C22 | 3.0 | | 22-3434 | | | | | | | 10% |
| C23 | 5.6 | | 22-3499 | | | | | | | N330 5% |
| C24 | 2.4 | | 22-3592 | | | | | | | NPO 5% |
| C25 | 800 | | 22-3577 | | | | | | | |
| C26 | 800 | | 22-3531 | BPD-0008 | DD-801 | L10T8 | ED-0008 | | 5GA-T8 | |
| C27 | 470 | 1000 | 22-8 | HVD-15-470 | DD-471 | BYA10T47 | HD15-470 | DC30347 | 5GA-T47 | |
| C28 | 10000 | | 22-3532 | BPD-01 | DD-103 | BYA801 | ED-01 | DC511 | 5HK-S1 | |
| C29 | .15 | 200 | 22-2147 | P388N-15 | | CUB2P15 | | GEM-2015 | 2TM-P15 | |
| C30 | 470 | 1000 | 22-8 | HVD-15-470 | DD-471 | BYA10T47 | HD15-470 | DC30347 | 5GA-T47 | |
| C31 | 12 | | 22-3279 | | | | | | | N75 5% |
| C32 | 13 | | 22-3279 | | | | | | | N75 5% |
| C33 | 470 | | 22-18 | | D6-471 | 5R5T47 | ED-470 | | MS-347 | 10% |
| C34A | 1000 | | 22-21 | | | 1R5D1 | ED-1000 | | MS-21 | 10% |
| B | 1000 | | | | | 1R5D1 | ED-1000 | | MS-21 | 10% |
| C35 | 470 | | 22-18 | | D6-471 | 5R5T47 | ED-470 | | MS-347 | 10% |
| C36 | 1000 | 1000 | 22-17 | | | | | | | 10% |
| C37 | 470 | | 22-3534 | | D6-471 | 5R5T47 | ED-470 | | MS-347 | |
| C38 | 470 | | 22-3217 | S1 470 | D6-471 | L70T47 | GP-470 | UC-5347 | 5GA-T47 | |
| C39 | 1000 | | 22-3213 | | | | | | | |
| C40 | 4 | | 22-3550 | | | | | | | N470 |
| C41 | 7 | | 22-2375 | | | | | | | N470 |
| C42 | .022 | 200 | 22-1781 | | | | | | | 10% |
| C43 | 47 | | 22-3457 | | | | | | | N80 5% |
| C44 | .1 | 200 | 22-1777 | P288N-1 | DF-104 | CUB2P1 | | GEM-201 | 2TM-P1 | |
| C45 | 10000 | | 22-3 | BPD-01 | DD-103 | BYA801 | ED-01 | DC511 | 5HK-S1 | |
| C46A | 1000 | | 22-21 | | | 1R5D1 | ED-1000 | | MS-21 | 10% |
| B | 1000 | | | | | 1R5D1 | ED-1000 | | MS-21 | 10% |
| C47 | 5.3 | | 22-3343 | NPO-S1 3.3 | TCZ-3R3 | C10Y33C | TCO-3.3 | ZT-5323 | 5TCCB-Y33 | |
| C48 | 50 | | 22-3460 | S1 50 | D6-500 | L75Q5 | GP-50 | UC-545 | 5GA-Q5 | |
| C49A | 1000 | | 22-21 | | | 1R5D1 | ED-1000 | | MS-21 | 10% |
| B | 1000 | | | | | 1R5D1 | ED-1000 | | MS-21 | 10% |
| C50 | 10 | | 22-3721 | NPO-DI 10 | TCZ-10 | C10QC | TCO-10 | ZT-540 | 5TCC-Q | 5% |
| C51 | 10000 | | 22-3 | BPD-01 | DD-103 | BYA801 | ED-01 | DC511 | 5HK-S1 | |
| C52 | 10000 | | 22-3 | BPD-01 | DD-103 | BYA801 | ED-01 | DC511 | 5HK-S1 | |
| C53 | 470 | 1000 | 22-8 | HVD-15-470 | DD-471 | BYA10T47 | HD15-470 | DC30347 | 5GA-T47 | |
| C54 | 2200 | | 22-9 | BPD-0023 | DD-223 | BYA10D22 | ED-0023 | UC-5223 | 5GA-D22 | |
| C55 | 39 | | 22-3706 | | | | | | | N750 10% |
| C56 | 3300 | | 22-11 | BPD-0033 | DD-333 | BYA10D33 | ED-0033 | UC-5233 | 5GA-D33 | |
| C57 | 470 | 1000 | 22-8 | HVD-15-470 | DD-471 | BYA10T47 | HD15-470 | DC30347 | 5GA-T47 | |
| C58 | 2200 | | 22-11 | BPD-0033 | DD-333 | BYA10D33 | ED-0033 | UC-5233 | 5GA-D33 | |
| C59 | .47 | 200 | 22-2146 | P288N-47 | | CUB2P47 | | GEM-2047 | 2TM-P47 | |
| C60 | 27 | | 22-3459 | | D6-270 | L76Q27 | GP-27 | UC-5427 | 5GA-Q27 | |
| C61 | .022 | 400 | 22-3625 | | | | | GEM-1611 | | 10% |
| C62 | .01 | 400 | 22-3565 | | | | | GEM-4011 | | 10% |
| C63 | .1 | 400 | 22-2081 | P488N-1 | DF-104 | CUB4P1 | | GEM-401 | 4TM-P1 | |
| C64 | .0047 | 800 | 22-1849 | | | | | GEM-16247 | | 10% |
| C65 | .022 | 400 | 22-3072 | P488N-022 | DD-303 | CUB4S22 | ED-03 | GEM-4122 | 4TM-S22 | |
| C66 | .22 | 200 | 22-2167 | P388N-22 | | CUB2P22 | | GEM-2022 | 2TM-P22 | |
| C67 | 100 | | 22-9 | | DD-101 | L10T1 | ED-100 | ZT-531 | MS-31 | 10% |
| C68 | 120 | | 22-3505 | 1469-0001S | TCZ-120 | 2SR5T12 | TCO-120 | | 5TCC-T12 | 5% |
| C69 | 1000 | 1000 | 22-17 | | | | | | | 10% |
| C70 | 4700 | | 22-16 | | | 1R5D47 | | | MS-347 | 10% |
| C71 | 470 | 1000 | 22-8 | HVD-15-470 | D6-471 | BYA10T47 | HD15-470 | DC30347 | 5GA-T47 | |

## PARTS LIST AND DESCRIPTIONS

### CAPACITORS (cont)

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| | CAP. | VOLT | ZENITH PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | ERIE PART No. | MALLORY PART No. | SPRAGUE PART No. | |
| C72 | .01 | 400 | 22-1809 | P488N-01 | DS-103 | CUB4S1 | GP-10000 | GEM-411 | 4TM-S1 | |
| C73 | 680 | | 22-3568 | 5464-00068 | DS-681 | 1S5T68 | ED-680 | | MS-358 | 10% |
| C74 | 1100 | | 22-3259 | 1494-0011 | | 1R5D11 | | | MS-311 | 10% |
| C75 | .1 | 200 | 22-1777 | P388N-1 | DF-104 | CUB2P1 | | GEM-201 | 2TM-P1 | |
| C76 | 1500 | | 22-3699 | 1467-0015 | D6-512 | 1W5D15 | ED-1500 | UC-5215 | 1TM-215 | |
| C77 | 1000 | | 22-3566 | | | | | | | N470 |
| C78A | 1500 | | 22-33 | BPD-2X0015 | DD2-152 | BYC5D015 | ED3-0015 | DCD5215 | 5HK-2D15 | |
| B | 1500 | | | | | | | | | |
| C79 | .01 | 400 | 22-1845 | P488N-01 | DS-103 | CUB4S1 | GP-10000 | GEM-411 | 4TM-S1 | |
| C80 | .15 | 400 | 22-2281 | P488N-15 | | CUB4P15 | | GEM-4015 | 4TM-P15 | |
| C81 | 75 | 4000 | 22-3954 | | | | | | | N1500 10% |
| C82 | 120 | 4000 | 22-3697 | | | | | | | 10% |
| C83 | 72 | 3000 | | | | | | | | 10% |

## CONTROLS

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|
| | RESISTANCE | WATTS | ZENITH PART No. | CENTRALAB PART No. | CLAROSTAT PART No. | IRC PART No. | MALLORY PART No. | |
| R1A | 1Meg | 1 | 63-3369 | B-69 | A47-1Meg-Z | | FP18L | Volume |
| B | Shaft | | | Not Req. | FS-3 | | Not Req. | |
| C | Switch | | | KB-1 | SWK-13 | | Not Req. | |
| R2A | 250K | ½ | 63-3572 | B-50 | A47-250K-S | QU-129 | U46 | Brightness |
| B | Shaft | | | KSS-3 | FS-3 | Not Req. | Not Req. | |
| R3A | 750K | ½ | 63-3298 | B-95 | A47-750K-S | QU-136 | U54 | Vert. Hold |
| B | Shaft | | | Not Req. | KSS-3 | Not Req. | Not Req. | |
| R4A | 5000Ω | 4(WW) | 63-3301 | 5YP999 | A10-5000 | | M5MPX | Contrast |
| B | Shaft | | | Not Req. | FS-3 | | DS-36 | |
| R5A | 1Meg | ½ | 63-3616 | B-70 | A47-1Meg-Z | QU-137 | U53 | Tone |
| B | Shaft | | | Not Req. | KSS-3 | Not Req. | Not Req. | |
| R6A | 7.5Meg | ½ | 63-3919 | AB-89 | A47-7.5Meg -S | QU-142 | U52 | Focus |
| B | Shaft | | | AK-1 | FKS-1/4 | RQ | Not Req. | |
| R7A | 7.5Meg | ½ | 63-3946 | AB-89 * | A47-7.5Meg -S * | RQ QU-143 * | U52 * | Height with 1Meg stop |
| B | Shaft | | | AK-1 | FKS-1/4 | RQ | Not Req. | |
| R8A | 1K | ½ | 63-3976 | AB-20 | A47-1K-S | QU-116 | T42L | AGC |
| B | Shaft | | | AK-1 | FKS-1/4 | RQ | Not Req. | |
| R9A | 3000Ω | ½ | 63-3588 | AB-3 | A47-3000-S | QU-113 | FT42EL | Vert. Lin. |
| B | Shaft | | | AK-1 | FKS-1/4 | RQ | Not Req. | |
| R10A | 4.5Meg | ½ | 63-3308 | AB-87 | A47-5Meg-S | QU-141 | T45L | Fringe Lock |
| B | Shaft | | | AK-1 | FKS-1/4 | RQ | Not Req. | |
| R11 | 750Ω | 2(WW) | 63-3284 | | 39-800 | FL-750 | | Buzz |

* Connect a 1Meg resistor in series with the right hand terminal.

## RESISTORS

**All wattages 1/2 watt, or less, unless otherwise listed.**

| ITEM No. | RATING | | ZENITH PART No. | NOTES |
|---|---|---|---|---|
| | OHMS | WATT | | |
| R12 | 33K | | 63-1779 | |
| R13 | 470K | | 63-3241 | |
| R14 | 47K | | 63-1788 | |
| R15 | 47Ω | | 63-1828 | |
| R16 | 100K | | 63-1771 | |
| R17 | 100K | | 63-2290 | |
| R18 | 4700Ω | | 63-1897 | |
| R19 | 470Ω | | 63-1834 | |
| R20 | 330Ω | | 63-1897 | |
| R21 | 68K | | 63-1866 | |
| R22 | 100K | | 63-1876 | |
| R23 | 10K | | 63-1853 | |
| R24 | 10K | 2 | 63-3170 | |
| R25 | 2200Ω | | 63-1926 | |
| R26 | 2.2Meg | | 63-1859 | |
| R27 | 56K | | 63-1858 | |
| R28 | 68Ω | | 63-1757 | |
| R29 | 470Ω | | 63-1772 | |
| R30 | 56Ω | | 63-1733 | |
| R31 | 18K | | 63-1838 | |
| R32 | 120K | | 63-1873 | |
| R33 | 120K | | 63-1873 | |
| R34 | 18K | | 63-1831 | |
| R35 | 8800Ω | | 63-1621 | |
| R36 | 470Ω | | 63-1772 | |
| R37 | 15Ω | | 63-1708 | |
| R38 | 180Ω | | 63-1754 | |
| R39 | 1800Ω | 2 | 63-3223 | |
| R40 | 120Ω | | 63-1747 | |
| R41 | 2200Ω 9% | | 63-1756 | |
| R42 | 33K | | 63-1848 | |
| R43 | 47K | | 63-1855 | |
| R44 | 1200Ω | 2 | 63-3288 | |
| R45 | 22K | 2 | 63-1566 | |
| R46 | 15Ω | | 63-1708 | |
| R47 | 220K | | 63-1884 | |
| R48 | 47K | | 63-1856 | |
| R49 | 15K | | 63-1834 | |
| R50 | 470K | | 63-1897 | |
| R51 | 470K | | 63-1897 | |
| R52 | 680K | | 63-1904 | |
| R53 | 180K | | 63-1880 | |
| R54 | 220K | | 63-1884 | |
| R55 | 220K | | 63-1884 | |
| R56 | 100K | | 63-1870 | |
| R57 | 10K | | 63-1827 | |
| R58 | 1.2Meg | | 63-1915 | |
| R59 | 680Ω | | 63-1779 | |
| R60 | 33K | 3 | 63-3241 | |
| R61 | 10000Ω | | 63-1788 | |
| R62 | 10K | | 63-1828 | |
| R63 | 470Ω | | 63-1771 | |
| R64 | 680Ω | 1 | 63-2290 | |
| R65 | 470K | | 63-1897 | |
| R66 | 15K | | 63-1834 | |
| R67 | 470K | | 63-1897 | |
| R68 | 82K | | 63-1866 | |
| R69 | 150K | | 63-1878 | |
| R70 | 10Meg | | 63-1953 | |
| R71 | 220K | | 63-1884 | |
| R72 | 47K | 2 | 63-1317 | |
| R73 | 220K | | 63-1883 | |
| R74 | 22Ω | | 63-1758 | |
| R75 | 2.2Meg | | 63-1926 | |
| R76 | 47K | | 63-1855 | |
| R77 | 100K | | 63-1869 | |
| R78 | 330Ω | 1 | 63-3241 | |
| R79 | 27K | | 63-1845 | |
| R80 | 220K | | 63-1884 | |
| R81 | 560Ω | | | |
| R82 | 560Ω | | | |
| R83 | 1Meg | | 63-1911 | |
| R84 | 1Meg | | 63-1911 | |
| R85 | 2900Ω | | 63-1810 | |
| R86 | 10Meg | | 63-1954 | |
| R87 | 5.6Meg | | 63-1943 | |
| R88 | 18K | | 63-1838 | |
| R89 | 47K | 1 | 63-1194 | |
| R90 | 560Ω | | 63-1775 | |
| R91 | 22K | | 63-1842 | |
| R92 | 10K | 2 | 63-3245 | |
| R93 | 47K | | 63-1856 | |
| R94 | 180K | 1 | 63-2313 | |
| R95 | 100Ω | | 63-1744 | |
| R96 | 100Ω | | 63-1688 | |
| R97 | 100Ω | | 63-1744 | |
| R98 | 18K | 2 | | Note 1 |
| R99 | 22K | 2 | | Note 1 |
| R100 | 56K | 2 | 63-3341 | |
| R101 | 150K | | 63-1877 | |
| R102 | 10000Ω | | 63-1786 | |
| R103 | 9.8Ω | | 63-3253 | |
| R104 | 22K | 1 | 63-1055 | |
| R105 | 220K | | 63-3607 | |
| R106 | 22K | | | |

Note 1. Some versions may use a single 10K, 4W (Part #63-3623) to replace R98 and R99.

## TRANSFORMER (POWER)

| ITEM No. | RATING | | | | REPLACEMENT DATA | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| | PRI. | SEC. 1 | SEC. 2 | SEC. 3 | ZENITH PART No. | Halldorson PART No. | Merit PART No. | Stancor PART No. | Thordarson PART No. | Triad PART No. |
| T1 | 117V | 560VCT @ 180 mA | 5V @ 3A | 6.3V @ 8.2A | 95-1497 ① | | | | | |

① Alternate part number 95-1544.

## TRANSFORMER (AUDIO OUTPUT)

| ITEM No. | IMPEDANCE | | REPLACEMENT DATA | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|
| | PRI. | SEC. | ZENITH PART No. | Halldorson PART No. | Merit PART No. | Stancor PART No. | Thordarson PART No. | Triad PART No. |
| T3 | 9400Ω | 3-4Ω | 95-1379 | Z1000 | A-2952 | A-3879 | 24880 | S-51X |

## TRANSFORMERS (SWEEP CIRCUITS)

| ITEM No. | USE | REPLACEMENT DATA | | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | | ZENITH PART No. | Halldorson PART No. | Merit PART No. | Ram PART No. | Stancor PART No. | Thordarson PART No. | Triad PART No. | |
| T2 | Vert Output | 95-1261 | | | V316 | A-8146 | 28S11 | | |
| T3A | Yoke-Horiz. (13MH) | 95-1548 ① | DF808 ② ③ | MDF-91 ② ③ | Y90F12/49 ② ③ | A-8145 DY-13A ② ③ | Y-39 | Y-42 & W43 | |
| B | (90°)-Vert.(42MH) | | | | | | | | |
| M6 | Rear Cover & Centering Device | S-2323TB | | | | | | YC1 | |
| T4 | Horiz. Output | S-4U98 | | | | | | | |

① Includes resistors(R81, R82), and capacitor (C83) .
② Use original rear cover and centering device and original horizontal damping network, if necessary
③ Connect yoke terminal #3 to horizontal output transformer terminal #3, yoke terminal #7 to resistor (R102), yoke terminal #1 to horizontal output transformer terminal #1

## SPEAKER

| ITEM No. | TYPE | | | REPLACEMENT DATA | | NOTES |
|---|---|---|---|---|---|---|
| | SIZE | FIELD | V C IMP | ZENITH PART No. | QUAM PART No | |
| SP1 | 5" | PM | 3-4Ω | 45-751 ① | 53A1 | ① Used in Models 22Z28RZ, RZU, 22Z30RZ, RZU, RZ, RZU |
| | 10" | PM | 3-4Ω | 45-752 ② | 10A31 | ② Used in Models 22Z57EZ, EZU, MZ, MZU, RZ, RZU, Z300EZ, HZ, RZ, YZ |
| | | | | 45-848 ③ | | ③ Used in Models 22Z30EZ, EZU, RZ, RZU |
| | | | | 45-793 ① | | |

## COILS (RF-IF)

| ITEM No. | USE | ZENITH PART No. | NOTES |
|---|---|---|---|
| L1 | IF Trap Coil | 30-490 | |
| L2 | IF Trap Coil | 30-505 | |
| L3 | IF Trap Coil | 30-505 | |
| L4 | IF Trap Coil | 30-490 | |
| L5 | IF Trap Coil | 30-490 | |
| L6 | IF Trap Coil | 30-490 | |
| L7 | Neut. Coil | 30-451 | |
| L8 | RF Coil | 30-537 | |
| L9 | Mixer Grid Coil | 30-538 | |
| L10 | RF Choke | S-18859 | |
| L11 | Osc. Coil | 30-541 | |
| L12 | Mixer Plate Coil | S-33702 | |

| ITEM No. | USE | REPLACEMENT DATA | | | | NOTES |
|---|---|---|---|---|---|---|
| | | ZENITH PART No. | MEISSNER PART No. | MERIT PART No. | MILLER PART No. | |
| L13 | 1st. Video IF | S-32502 | | | | |
| L14A | 47.25MC Trap | S-40235 | | | | |
| B | 39.75MC Trap | | | | | |
| L15 | 2nd. Video IF | S-17907 | | | | |
| L16 | 3rd. Video IF | S-19953 | | | | |
| L17 | 4th. Video IF | S-32696 | | | | Complete assembly |
| L18A | 4.5MC Trap | S-24736 | | TV-130 | | |
| B | 1st. Sound IF | | | | | |
| L19 | Series Peaking Coil | S-21563 | 19-3135 * | TV-105 * | 6153 * | 135 Microhenries, wound on 5600Ω resistor |
| L20 | 2nd. Sound IF | S-19902 | | | | Complete assembly |
| L21 | Quadrature Coil | S-19020 | 20-1005 ▲ | TV-121 | 1490 ▲ | |

* Parallel with 5600Ω resistor.
▲ Drill new mounting hole.

## TRANSFORMER (HORIZ. OSC.)

| ITEM No. | DC RES | | REPLACEMENT DATA | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | PRI. | SEC. | ZENITH PART No. | Meissner PART No. | Merit PART No. | Miller PART No. | Ram PART No. | Thordarson PART No. | |
| L22 | 163Ω * | | S-19743 | 19-1577 | MWC-13 | 6394 | | RS-6 | 90-110 Millihenries * Tapped @ 75Ω |

## FILTER CHOKE

| ITEM No. | RATINGS | | | REPLACEMENT DATA | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| | TOTAL DIRECT CURRENT | D.C. RESISTANCE | INDUCTANCE @ CURRENT 1000 (mA) | ZENITH PART No. | Halldorson PART No. | Merit PART No. | Stancor PART No. | Thordarson PART No. | Triad PART No. | |
| L23 | .280A | 68Ω | 1.7 Hy. | 95-1376 | CS057 ② | C-2991 ② | C-2326 ② | 26C44 | C-23X | |
| | .280A | 52Ω | 1.2 Hy. | 95-1536 ① | CS 039 ③ | C-2991 ③ | C-2327 | 26C41 | C-23X | |

① Alternate part number used in some versions.
② Drill new mounting hole.

## COMPONENT COMBINATIONS

| ITEM No. | USE | DESCRIPTION | ZENITH PART No. | REPLACEMENT DATA |
|---|---|---|---|---|
| K1 | Vert. Integrator | | 87-5 | |
| K2 | Vert. Feedback | | 87-4 | |

ZENITH MODELS 22Z29RZ, RZU, 22Z30EZ, EZU, RZ, RZU, 22Z57EZ, EZU, MZ, MZU, RZ, RZU, Z300EZ, HZ, RZ, YZ (CH. 19232, U, Q)

FOLDER 4

# PARTS LIST AND DESCRIPTIONS (Continued)

## FUSES

| ITEM No. | TYPE | RATING | REPLACEMENT DATA | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | ZENITH PART No. | | LITTELFUSE PART No. | | BUSS PART No. | |
| | | | FUSE | HOLDER | FUSE | HOLDER | FUSE | HOLDER |
| M1 | N | 3/10A 125V S/B | 136-33 | 62-18 | 333.300 (N 3/10A - 125V- S/B) | 346008 | N 3/10 | HW 0 to 3/10 |

## CRYSTAL DIODES

| ITEM No. | ORIG. TYPE | REPLACEMENT DATA | | | NOTES |
|---|---|---|---|---|---|
| | | ZENITH PART No. | CBS PART No. | SYLVANIA PART No. | |
| M2 | 1N64 | 103-1 | 1N64 | 1N60 | Video Detector (Pigtail) |

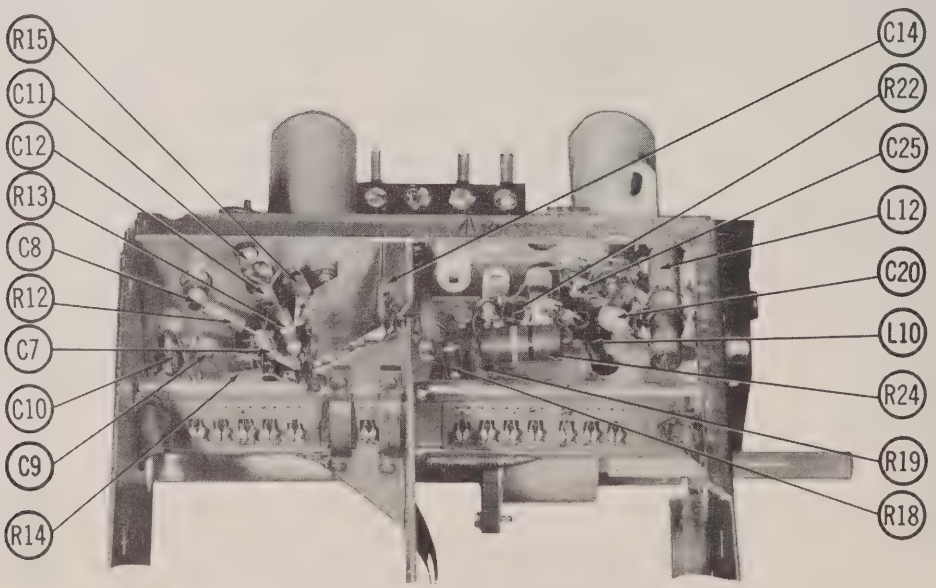
## MISCELLANEOUS

| ITEM No. | PART NAME | ZENITH PART No. | NOTES |
|---|---|---|---|
| M3 | Dial Lamp | 100-198 | #39 |
| M4 | Tuner | S-21735 | VHF - Ch. 19Z32 |
| | Tuner | S-23113 | VHF - Ch.19Z32U |
| | Tuner | S-41364 | UHF - Ch. 19Z32U |
| | Tuner | S-24712 | VHF - Ch. 19Z32Q |
| M5 | Width Sleeve | | |
| M6 | Centering Device | S-23237B | Includes yoke cover |
| M7 | Ion Trap | S-22574 | |
| M8 | Magnet | S-18763 | Anti-pin cushion (2 used) |

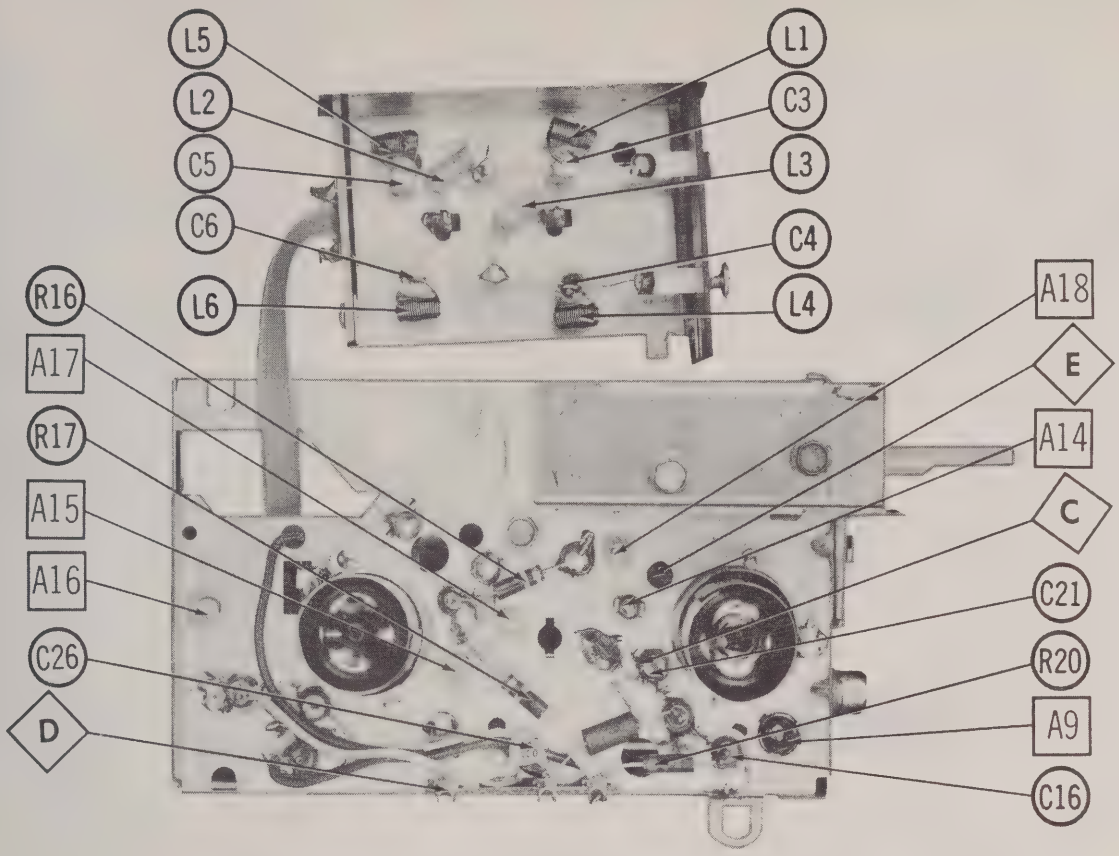
## CABINETS & CABINET PARTS

**(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)**

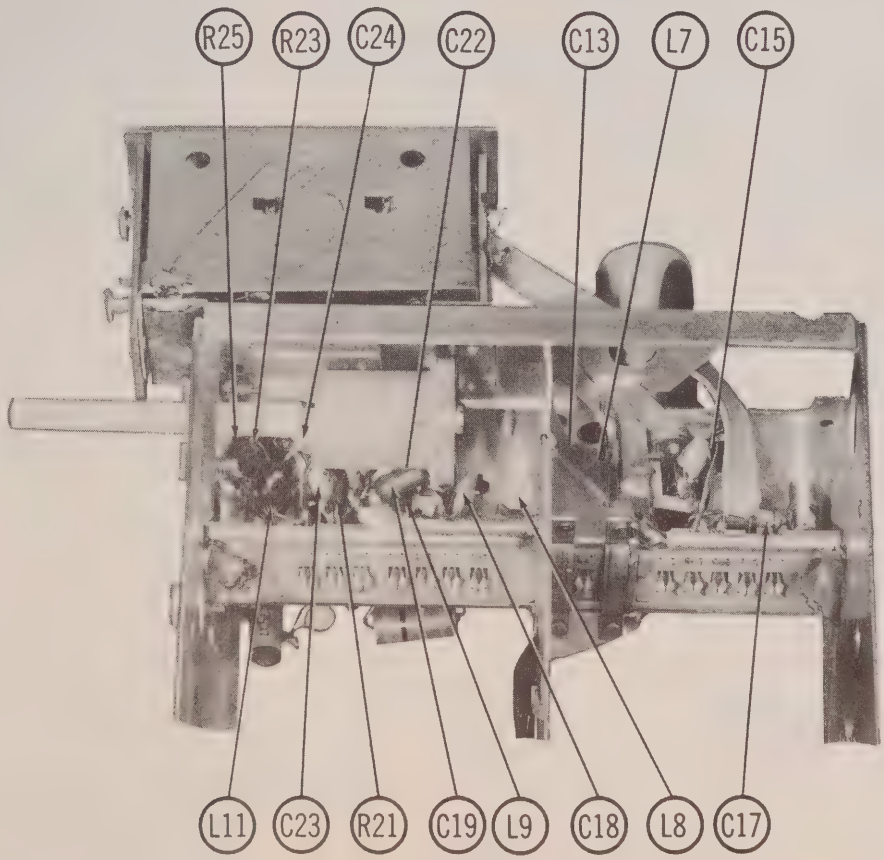
| NAME | PART NO. | DESCRIPTION |
|---|---|---|
| Safety Glass | 192-220 | Models Z2229RZ, RZU, Z2230EZ, EZU, RZ, RZU |
| Safety Glass | 192-225 | Models Z2257EZ, EZU, MZ, MZU, RZ, RZU, Z3010EZ, HZ, RZ, YZ |
| Escutcheon | 57-2336 | Models Z2229RZ, RZU |
| Escutcheon | 57-2337 | Models Z2230EZ, EZU, RZ, RZU |
| Escutcheon | 57-2249 | Models Z2257EZ, EZU, RZ, RZU, MZ, MZU |
| Escutcheon | 57-2250 | Models Z3010EZ, HZ, RZ, YZ |
| Knob | S-41059 | Channel Selector - Models Z2229RZ, Z2230EZ, EZU, RZ, RZU |
| Knob | S-40954 | Channel Selector - Models Z2257EZ, EZU, MZ, MZU, RZ, RZU |
| Knob | S-24580 | Channel Selector - Models Z3010EZ, HZ, RZ, YZ |
| Knob | S-22408 | VHF Fine Tuning |
| Knob | S-22863 | UHF Tuning |
| Dial | S-22025 | UHF |
| Knob | 46-1703 | On-off-volume - Models Z2229RZ, RZU, Z2230EZ, EZU, RZ, RZU |
| Knob | 46-1736 | On-off-volume - Models Z2257EZ, EZU, MZ, MZU, RZ, RZU |
| Knob | 46-1742 | On-off-volume - Models Z3010EZ, HZ, RZ, YZ |
| Knob | 46-1117 | Horiz. Hold |
| Knob | 46-1181 | Vert. Hold, brightness, contrast, tone - Models Z2229RZ, RZU, Z2230EZ, EZU, RZ, RZU |
| Knob | S-22935 | Vert. Hold, brightness, contrast, tone - Models Z2257EZ, EZU, MZ, MZU, RZ, RZU, Z3010EZ, HZ, RZ, YZ |
| Cabinet | 14-1954 | Models Z2229RZ, RZU |
| Cabinet | 14-1956 | Models Z2230EZ, EZU |
| Cabinet | 14-1955 | Models Z2230RZ, RZU |
| Cabinet | 14-2155E | Models Z2257EZ, EZU |
| Cabinet | 14-2155M | Models Z2257MZ, MZU |
| Cabinet | 14-2155R | Models Z2257RZ, RZU |
| Cabinet | 14-2181E | Model Z3010EZ |
| Cabinet | 14-2181H | Model Z3010HZ |
| Cabinet | 14-2181R | Model Z3010RZ |
| Cabinet | 14-2181Y | Model Z3010YZ |




RF TUNER RIGHT SIDE

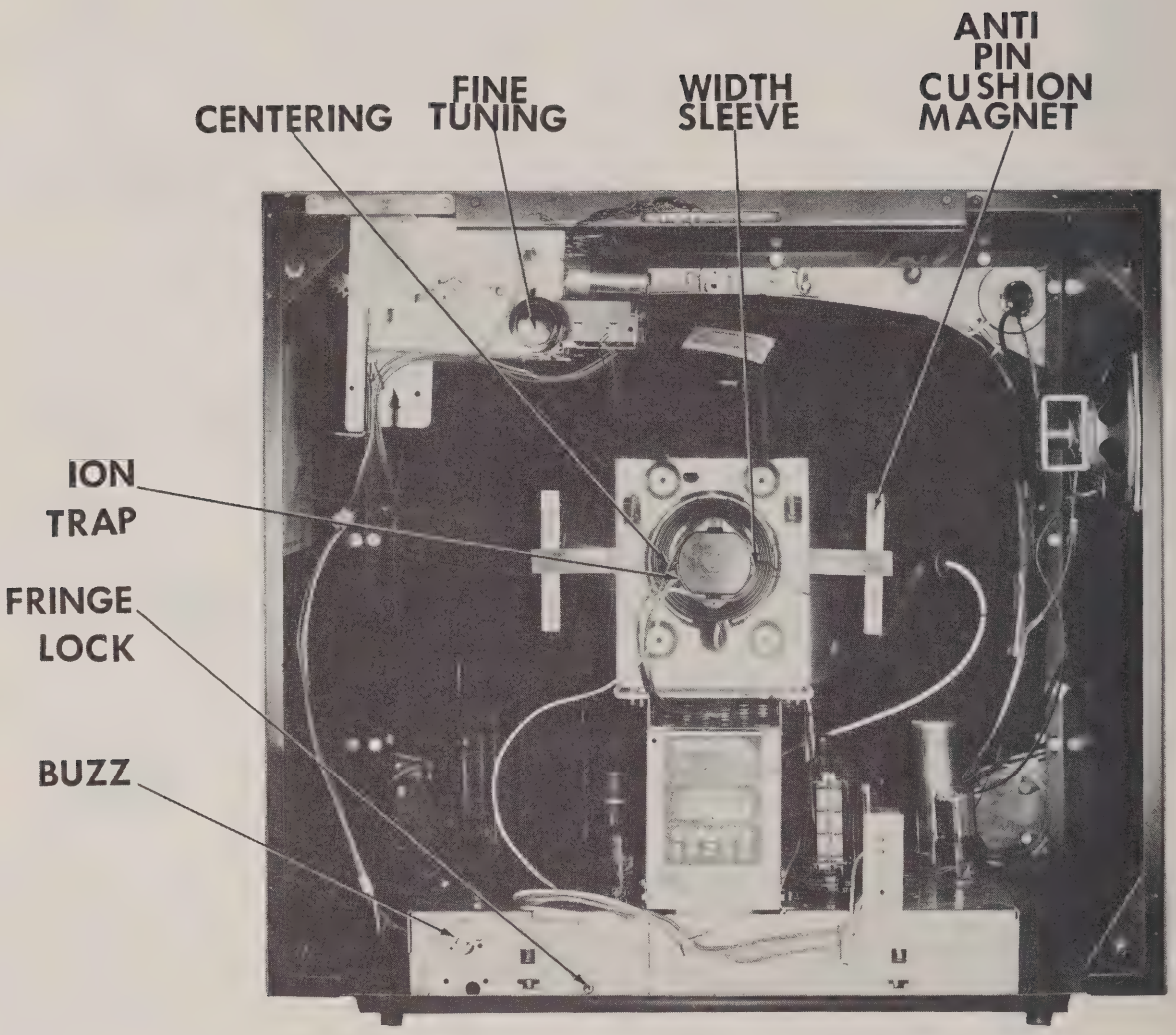



RF TUNER-TOP VIEW




RF TUNER-LEFT SIDE

FOLDER 4




## CABINET—REAR VIEW

## HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably with a test pattern.

Set the brightness and contrast controls for a normal picture.

Turn the horizontal hold clockwise until the picture loses sync.

It may be necessary to switch off channel and back again for picture to lose sync.

Turn the horizontal hold slowly counter clockwise until the picture just falls into sync.

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 9 IN SET 314

RCA Victor Models 21CT660U, 21CT661U, 21CT662U, 21CT663U and 21CT664U (Ch. CTC4, A) were covered in Photofact Folder 9 — Set 314.

Models 21CT663U and 21CT664U now use chassis CTC4B and are added along with the late production changes with the publication of this bulletin.

COMPONENT CHANGES

C10A is increased from 10mfd to 20mfd.

C10B is increased from 10mfd to 20mfd.

C67 is decreased from .039mfd to .01mfd.

C152 is increased from 4mmf to 6.8mmf.

C172 is increased from .01mfd to .047mfd.

C168 is increased from .01mfd to .047mfd.

C163 is increased from .01mfd to .047mfd.

C170 is increased from 270mmf to 1200mmf.

C166 is decreased from 39mmf to 27mmf.

C142 is removed from across R175 and reconnected from pin 6 of V24 to ground.

C169 is increased from 2mmf to 3mmf.

A .01mfd ⓐ 500V capacitor is added from pin 3 of V9A to ground.

A .1mfd ⓐ 600V capacitor is added from the junction of R18 and R214 to ground.

A 22mmf ⓐ 500V capacitor is added between C61 and pin 7 of V6A.

L94 is omitted.

L89 is changed to part #100597.

L85 is changed to part #102315.

L95 is changed to part #71526.

R17, R18, R19 are changed to part #101821.

R157 is increased from 2200Ω to 2700Ω.

A 220Ω, ½ watt resistor is added from pins 2-9 of V7 to the junction of R63 and L67.

R193 and R194 are increased from 56K to 82K.

R195 is decreased from 120K to 110K.

R201 and R202 are replaced with one 120K resistor.

R150 and R151 are increased from 470K to 1Meg.

R206 is decreased from 56K to 47K.

R214 is increased from 56K to 120K.

R210 is increased from 1500Ω to 2700Ω, 2 watt.

R142 is omitted.

A 560Ω, ½ watt resistor is wired in parallel with the adjustable trimmer at A13.

An 18Meg, ½ watt resistor is added from terminal A of L80 to pin 6 of V20A.

A 4700Ω, 1 watt resistor is added from pin 3 of V9A to the 270 voltage source.

An 82K, 2 watt resistor is wired in parallel with R193 and R194.

V16 (Damper) is changed from 6BL4 to 6AU4GTA.

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PRODUCTION CHANGES
BULLETIN 198

RCA VICTOR MODELS 21CT660U, 21CT661U, 21CT662U, 21CT663U, 21CT664U (Ch. CTC4, A, B)

PRODUCTION CHANGES
BULLETIN 198

(Continued on Reverse Side)

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| | |
|---|---|
| | CONVERGENCE CIRCUIT REVISED<br>The convergence circuit has been revised. A partial schematic showing the new circuit is given in Fig. 1. |
| Ch. CTC4B | SPEAKERS CHANGED<br>In chassis CTC4B a different speaker arrangement is used. Two 3½" PM speakers plus an 8" PM speaker is used. The part number for the 3½" PM speaker is #102119 and for the 8" PM speaker is #77872. A partial schematic showing the new circuit is given in Fig. 2.<br><br>COMPONENT CHANGES<br>C81 is decreased from .0022mfd to .001mfd.<br>C83 is decreased from .022mfd to .0056mfd.<br>C82 is increased from .0033mfd to .0082mfd.<br>C88 is decreased from .0027mfd to .0022mfd.<br>C89 is increased from .0027mfd to .0033mfd.<br>C94 is increased from 22K to 39K. |

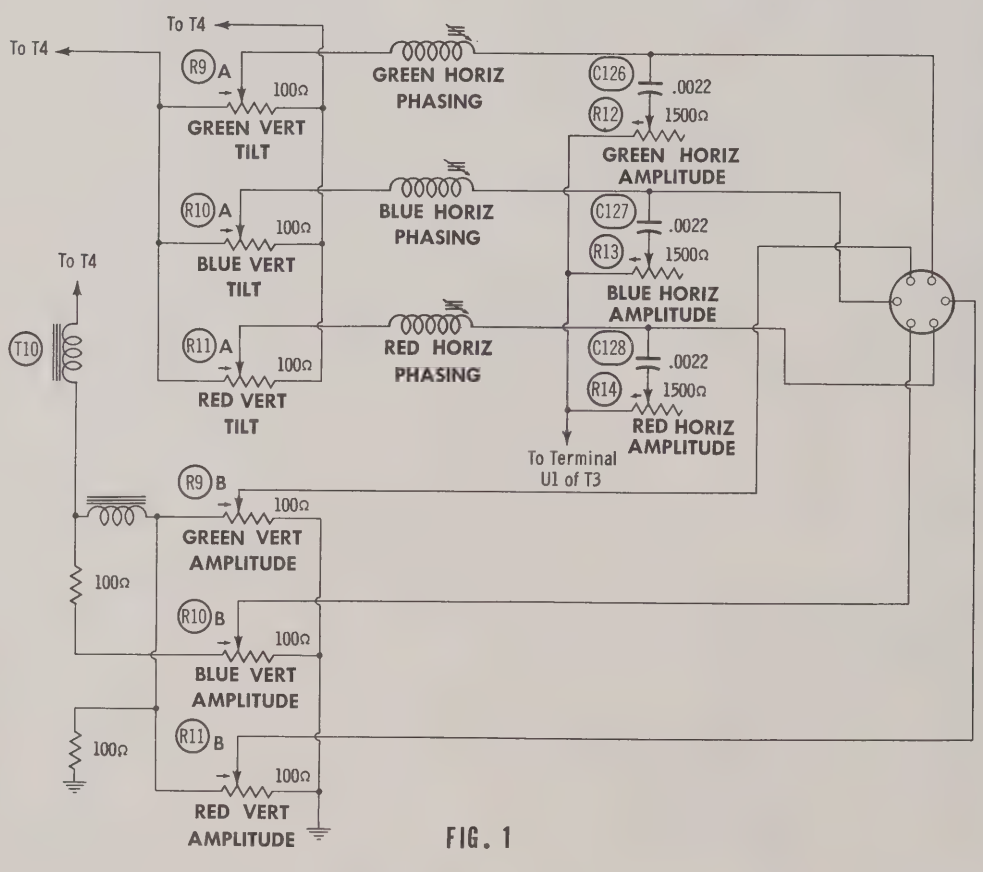



FIG. 1

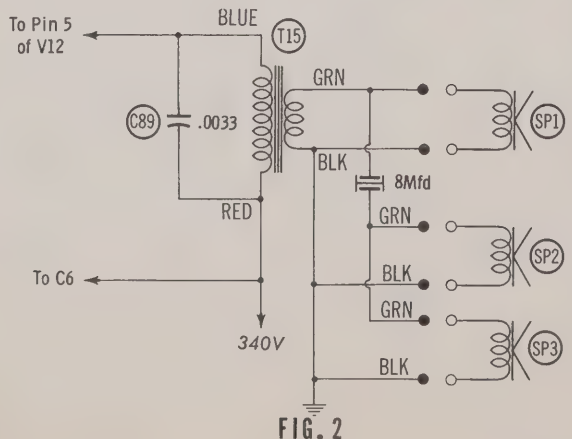



FIG. 2

CORRECTION NOTICE

The following corrections should be noted in Folder 9 — Set 314 (RCA Victor Ch. CTC4, A).

Page 2 (Schematic Diagram) Capacitors C3B - 40mfd (▲) and C4C - 80mfd (■)(located in cathode circuit of audio output tube) should be transposed. The negative leads of both capacitors should connect to -23 volts.

The physical location of capacitors C1 and C2 should be reversed from that which is shown on pages 9, 15 and 19.

The fuse mentioned in the pre-alignment instructions should be M5 instead of M3. In step 43 of the alignment instructions the 1500Ω resistor mentioned is 100 watts, not 10 watts.

## SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 4 IN SET 359

CORONADO MODEL TV3-9397B

Coronado Model TV3-9397A was covered in Photofact Folder 4 — Set 359.

Model TV3-9397B is electrically identical to the model covered except for the following change.

NEW VHF TUNER

Model TV3-9397B uses tuner #1-3468. A partial schematic showing the new tuner is given on the reverse side. Alignment procedure is essentially the same for the tuner covered in Photofact Folder 4 — Set 359.

(Continued on Reverse Side)

## SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 9 IN SET 375

GENERAL ELECTRIC MODELS P710C', P711C'

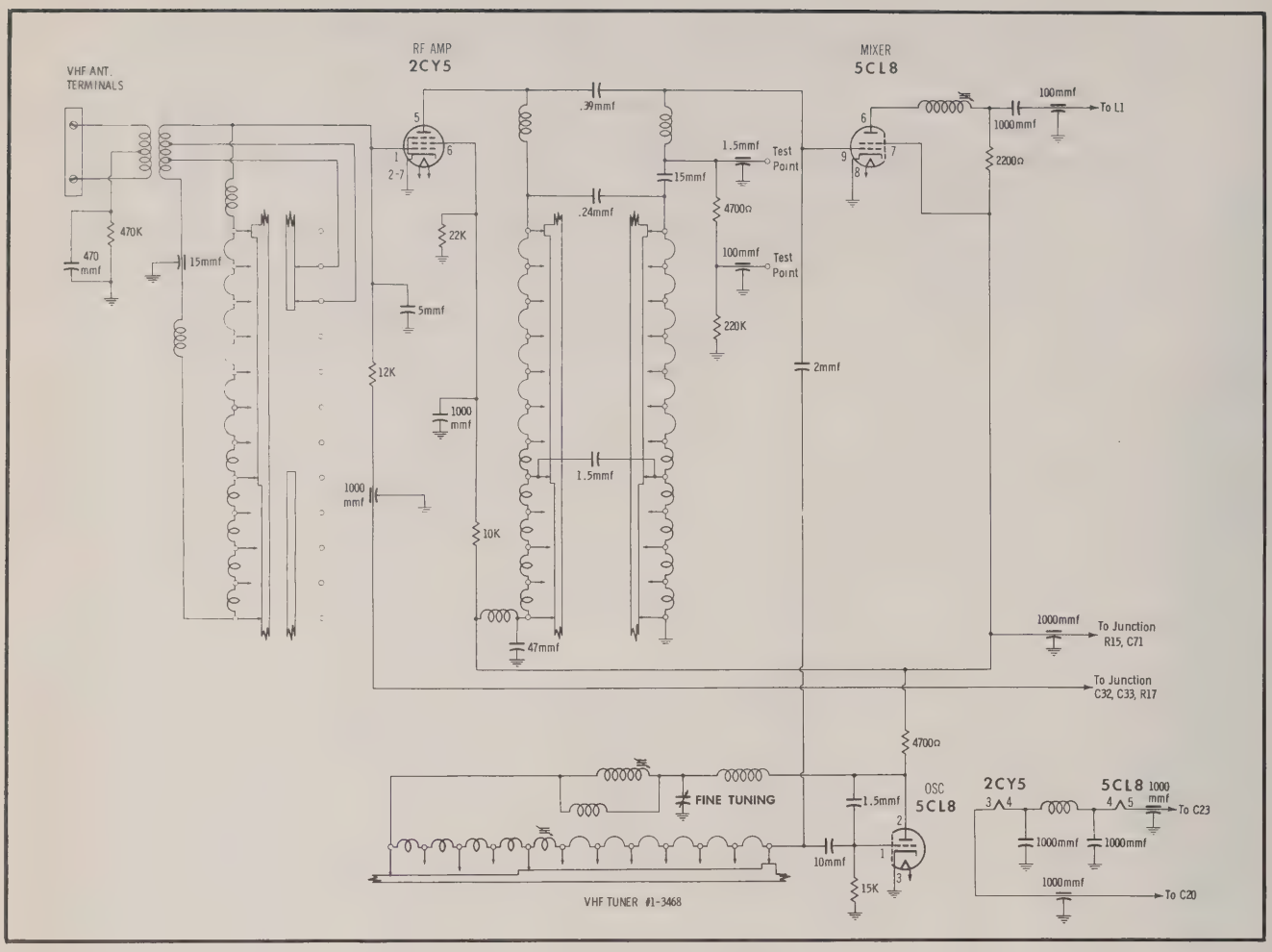
General Electric Models P710A, B, C, P711A, B, C were covered in Photofact Folder 9 — Set 375.

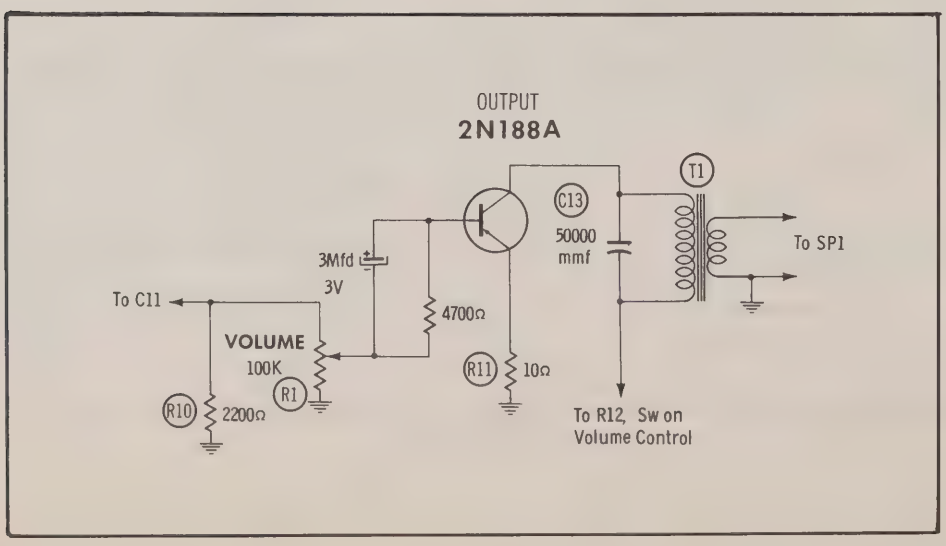
Models P710C' and P711C' are electrically identical to the models covered except for the following changes.

AUDIO OUTPUT CIRCUIT CHANGED

The audio output circuit has been changed. A partial schematic showing the new circuit is given on the reverse side.

(Continued on Reverse Side)


VHF ANT. TERMINALS
RF AMP
2CY5
MIXER
5CL8
470K
470 mmf
15mmf
5mmf
12K
1000 mmf
1000 mmf
22K
10K
.39mmf
.24mmf
15mmf
1.5mmf
47mmf
1.5mmf
Test Point
4700Ω
100mmf
Test Point
220K
2mmf
100mmf
To L1
1000mmf
2200Ω
1000mmf
To Junction R15, C71
To Junction C32, C33, R17
4700Ω
FINE TUNING
OSC
5CL8
1.5mmf
10mmf
15K
2CY5
5CL8
1000 mmf
To C23
1000mmf
1000mmf
1000mmf
To C20
VHF TUNER #1-3468


OUTPUT
2N188A
T1
C13
50000 mmf
To SP1
3Mfd
3V
To C11
4700Ω
VOLUME
100K
R1
R10
2200Ω
R11
10Ω
To R12, Sw on Volume Control

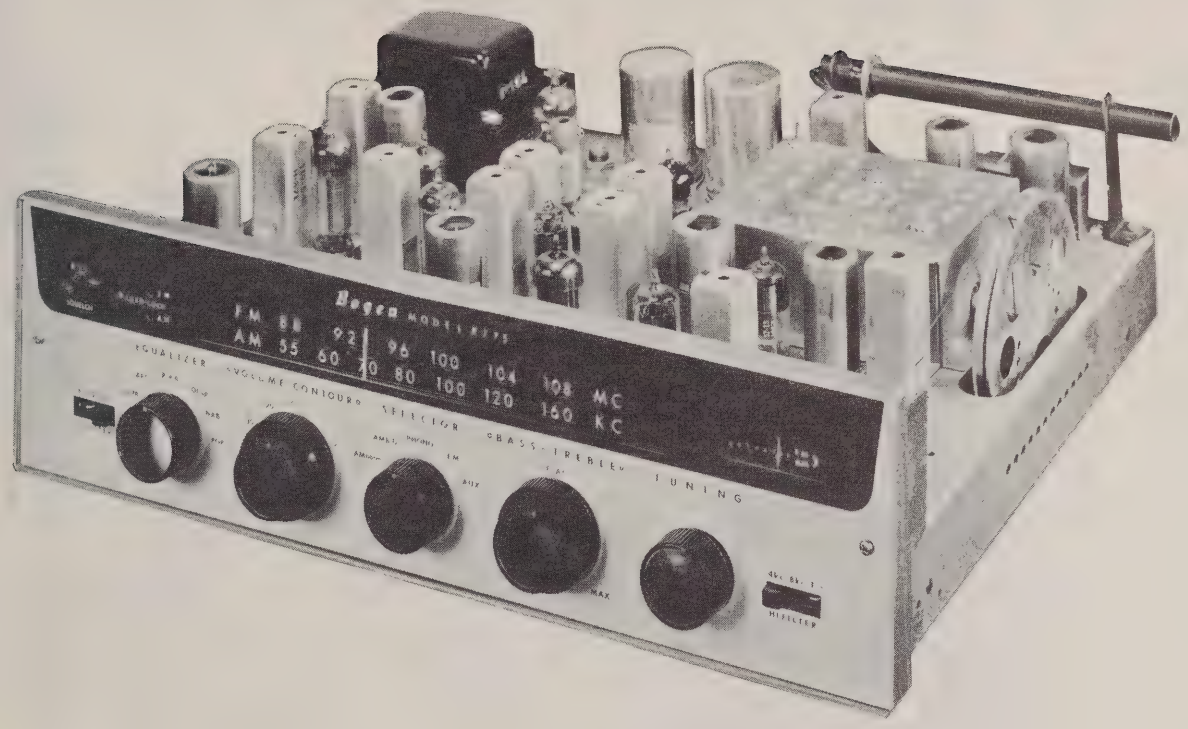
PHOTOFACT* Folder

*TRADE MARK

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

# DAVID BOGEN MODEL R775

DAVID BOGEN MODEL R775




DAVID BOGEN MODEL R775

| | | | |
|---|---|---|---|
| TRADE NAME | David Bogen Model R775 | | |
| MANUFACTURER | David Bogen Co., Inc., P. O. Box 500, Paramus, N. J. | | |
| TYPE SET | AC Operated FM-AM Tuner | | |
| TUBES | Seventeen | | |
| POWER SUPPLY | 110-120 Volts AC-60 Cycles | RATING | .66 Amp. @ 117 Volts AC (70 Watts) |
| TUNING RANGE—BROADCAST | 530KC-1650KC | FREQ. MOD. | 88MC-108MC |

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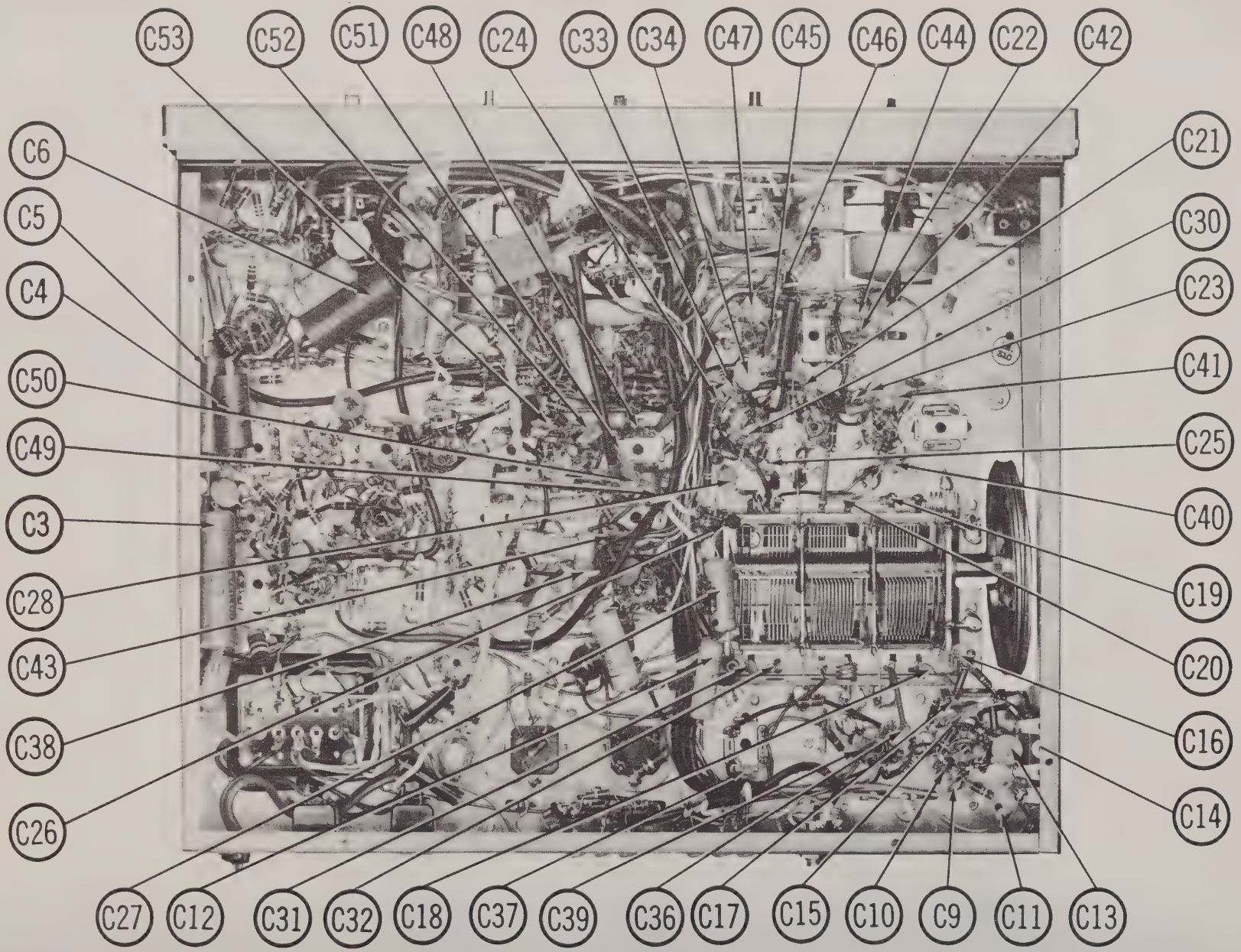
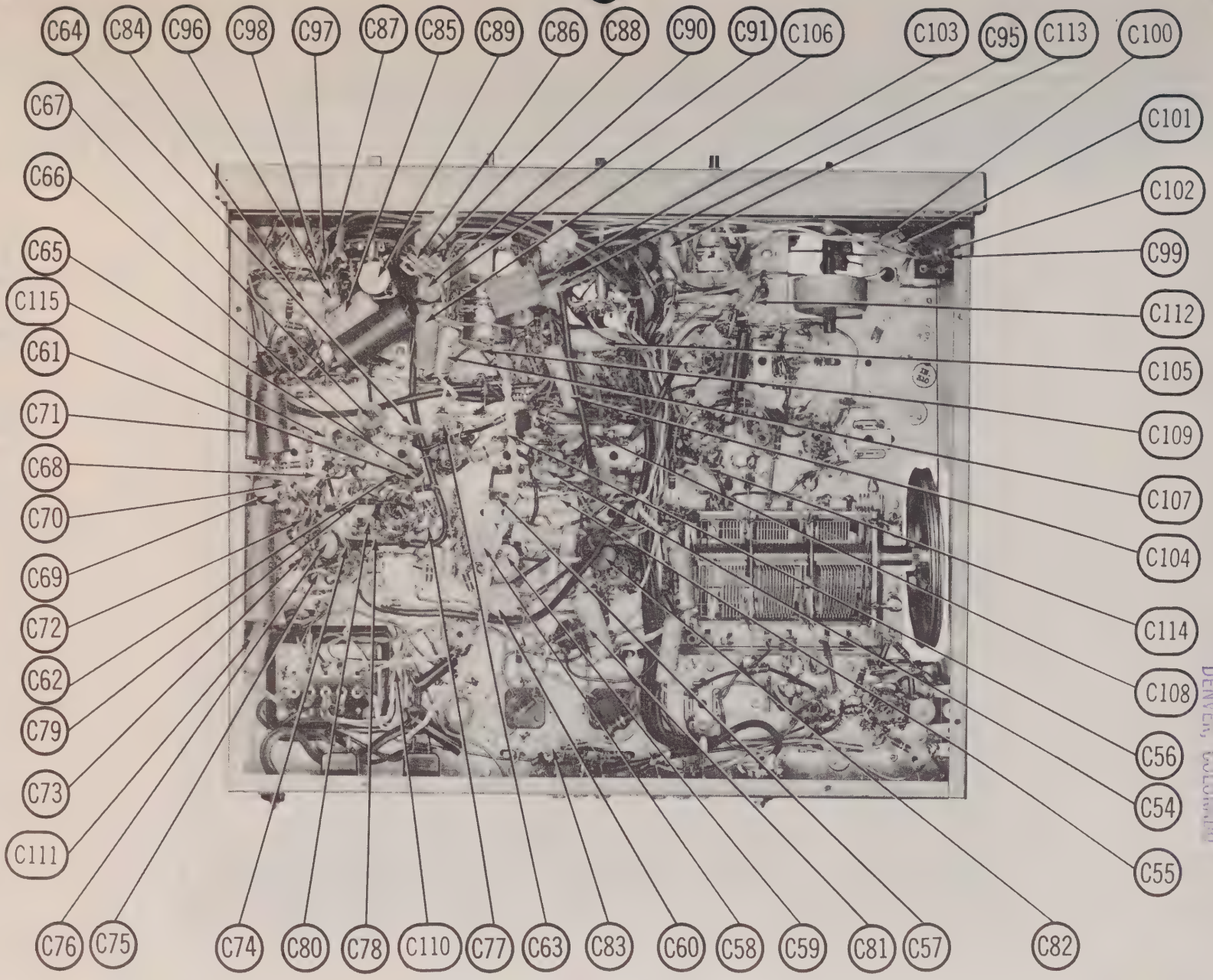



**CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION**




CHASSIS-BOTTOM VIEW-CAPACITOR IDENTIFICATION

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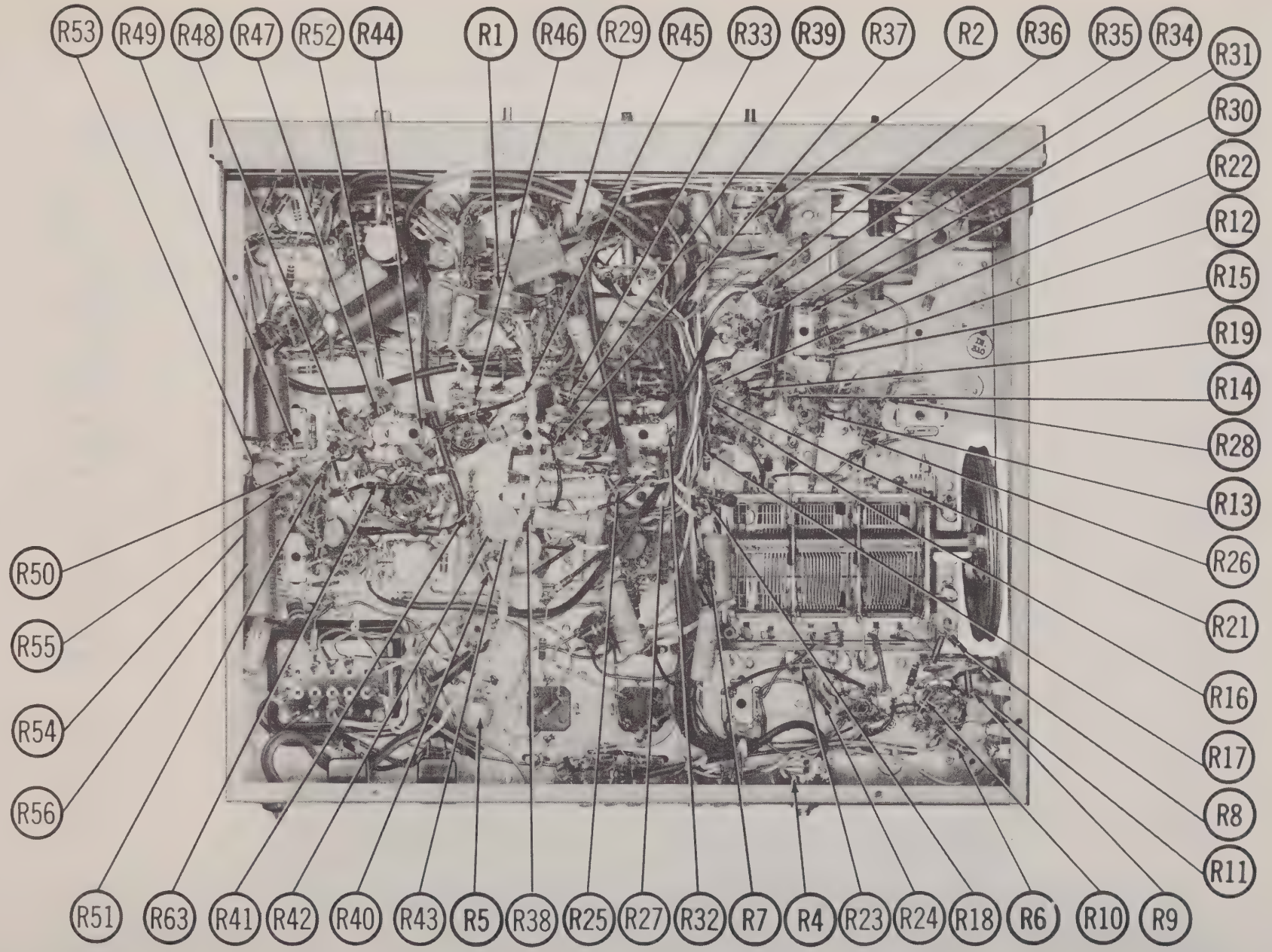
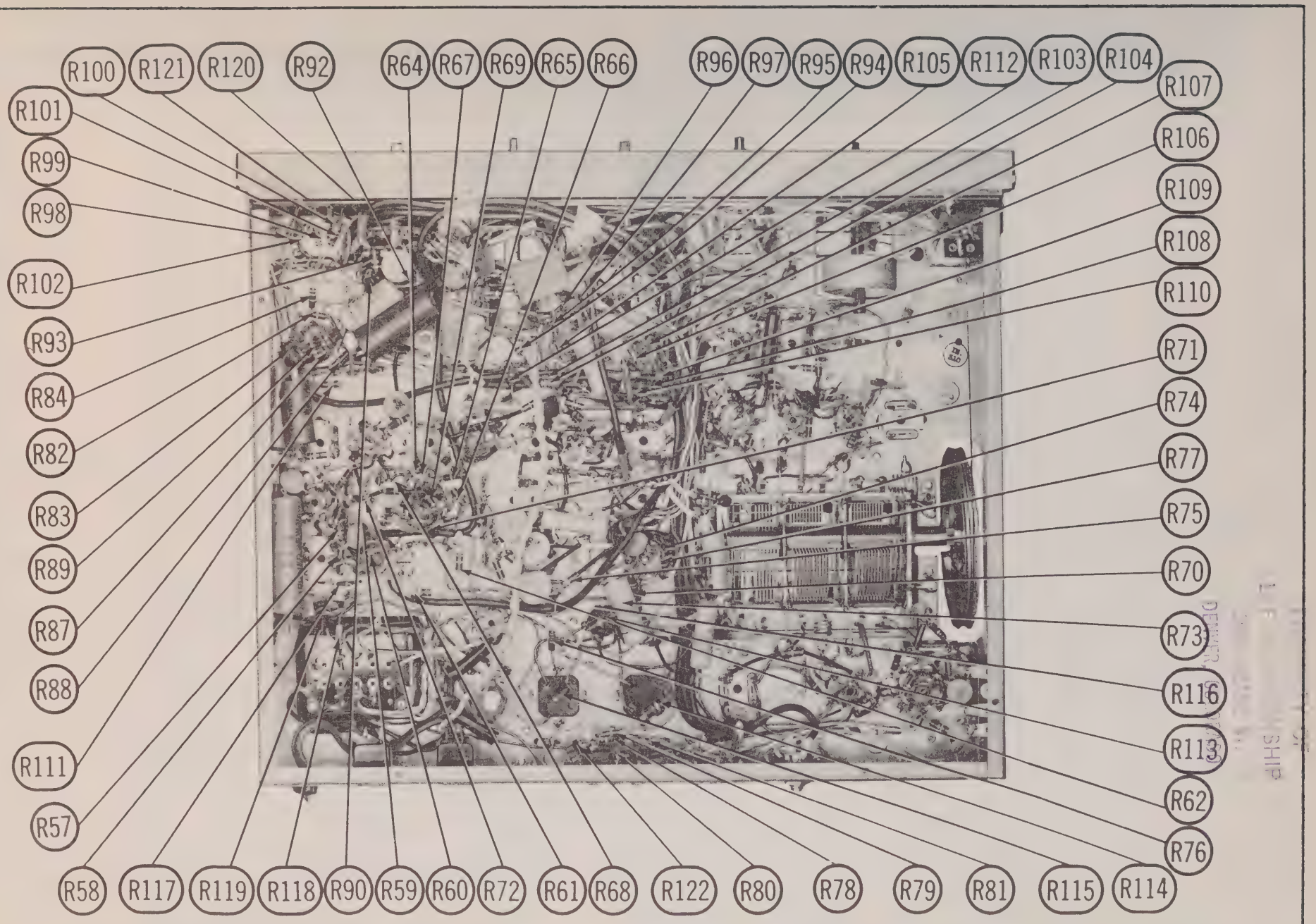
DAVID BOGEN
MODEL R775




**CHASSIS-BOTTOM VIEW-RESISTOR IDENTIFICATION**




CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

DAVID BOGEN
MODEL R775

# PARTS LIST AND DESCRIPTIONS

## TUBES ( GENERAL ELECTRIC, SYLVANIA )

| ITEM No. | USE | TYPE |
|---|---|---|
| V1 | FM RF Amplifier | 6BK7A |
| V2 | FM Mixer | 6AB4 |
| V3 | FM Osc. - FM AFC | 6U8 |
| V4 | 1st FM IF Amplifier | 6BA6 |
| V5 | AM RF Amplifier | 6BA6 |
| V6 | AM Converter | 6BE6 |
| V7 | 2nd FM-1st AM IF Amp. | 6BA6 |
| V8 | 2nd FM IF Amp. - AM Det. - AVC | 6AU6 |
| V9 | 1st Limiter | 6BN6 |
| V10 | 2nd Limiter | 6AU6 |
| V11 | Discriminator | 6AL5 |
| V12 | Squelch | 6BJ7 |
| V13 | AFC Cont. -Meter Amp. | 12AT7/ECC81 |
| V14 | Phono Preamplifier | 12AX7/ECC83 |
| V15 | AF Amplifier | 12AT7/ECC81 |
| V16 | AF Amplifier-Cath. Follower | 12AX7/ECC83 |
| V17 | Rectifier | 6BW4/EZ80 |

## ELECTROLYTIC CAPACITORS

| ITEM No. | RATING CAP. | RATING VOLT. | David Bogen PART No. | AEROVOX PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | PYRAMID PART No. | SANGAMO PART No. | SPRAGUE PART No. |
|---|---|---|---|---|---|---|---|---|---|
| C1A | ▰30 | 350 | | AFH3-28-30 | | | | | R1151 * |
| B | ■20 | 350 | | | | | | | |
| C | ▲10 | 350 | | | | | | | |
| C2A | ▰30 | 350 | | AFH3-28-30 | | | | | R1151 * |
| B | ■20 | 350 | | | | | | | |
| C | ▲10 | 350 | | | | | | | |
| C3 | 100 | 25 | | PRS25V100 | BBR100-25 | TC2501 | TD-100-25 | MTH-2510 | TVA-1207 |
| C4 | 8 | 250 | | PRS250V8 | BBR8-250 | TC51 | TD-8-250 | MT-2508 | TVA-1503 |
| C5 | 100 | 6 | | PRS6V100 | BBR100-6 | TC2501 | TD-100-6 | MTH-0610 | TVA-1101 |
| C6 | 8 | 250 | | PRS250V8 | BBR8-250 | TC51 | TD-8-250 | MT-2508 | TVA-1503 |

* Non Catalog Item

## FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

| ITEM No. | RATING CAP. | RATING VOLT | David Bogen PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | ERIE PART No. | MALLORY PART No. | SPRAGUE PART No. | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| C7 | 27 | | | | TCZ-27 | L10Q27 | ED-27 | | | NPO 10% |
| C8 | 2.4 | | | | | | | | | |
| C9 | 220 | | | NPO-SI 220 | D6-221 | L10T22 | ED-220 | | | 10% |
| C10 | 4.7 | | | | | | | | | N330 10% |
| C11 | 220 | | | NPO-SI 220 | D6-221 | L10T22 | ED-220 | | | 10% |
| C12 | .047 | 200 | | BPD-05 | DF-503 | CUB2S47 | | GEM-4147 | 4TM-S47 | |
| C13 | 1000 | | | BPD-001 | DD-102 | BYA6D1 | ED-1000 | DC521 | 5HK-D1 | |
| C14 | 220 | | | NPO-SI 220 | D6-221 | L10T22 | ED-220 | | | 10% |
| C15 | 220 | | | NPO-SI 220 | D6-221 | L10T22 | ED-220 | | | 10% |
| C16 | 220 | | | NPO-SI 220 | D6-221 | L10T22 | ED-220 | | | 10% |
| C17 | 10000 | | | BPD-01 | DD-103 | BYA6S1 | ED-01 | DC511 | 5HK-S1 | |
| C18 | 100 | | | NPO-SI 100 | D6-101 | L10T1 | ED-100 | | | 10% |
| C19 | .68 | | | | TCZ-R68 | | TCO-.68 | | | |
| C20 | 1000 | | | BPD-001 | DD-102 | BYA6D1 | ED-1000 | DC521 | 5HK-D1 | |
| C21 | 10000 | | | BPD-01 | DD-103 | BYA6S1 | ED-01 | DC511 | 5HK-S1 | ① |
| C22 | 10000 | | | BPD-01 | DD-103 | BYA6S1 | ED-01 | DC511 | 5HK-S1 | |
| C23 | 220 | | | BPD-00022 | D6-221 | L10T22 | ED-220 | UC-5322 | 5GA-T22 | |
| C24 | 220 | | | NPO-SI 220 | D6-221 | L10T22 | ED-220 | | | 10% |
| C25 | 220 | | | NPO-SI 220 | D6-221 | L10T22 | ED-220 | | | 10% |
| C26 | 100 | | | BPD-0001 | DD-101 | L10T1 | ED-100 | UC-531 | 5GA-T1 | ① |
| C27 | .1 | 200 | | P288N-1 | DF-104 | CUB2P1 | | GEM-201 | 2TM-P1 | |
| C28 | 47 | | | NPO-SI 47 | D6-470 | L10Q47 | ED-47 | ZT-5447 | 5TCU-Q47 | 10% |
| C29 | | | | | | | | | | |
| C30 | 47 | | | NPO-SI 47 | D6-470 | L10Q47 | ED-47 | ZT-5447 | 5TCU-Q47 | 10% |
| C31 | 5 | | | | | | | | | N1500 ① |
| C32 | 1.2 | | | | | | | | | |
| C33 | 220 | | | NPO-SI 220 | D6-221 | L10T22 | ED-220 | | | 10% |
| C34 | 10000 | | | BPD-01 | DD-103 | BYA6S1 | ED-01 | DC511 | 5HK-S1 | |
| C35 | 1.2 | | | | | | | | | |
| C36 | 100 | | | NPO-SI 100 | D6-101 | L10T1 | ED-100 | | | 10% |
| C37 | 22 | | | N750-SI 22 | TCN-22 | C10Q22U | TC7-22 | | | N750 |
| C38 | .047 | 200 | | BPD-05 | DF-503 | CUB2S47 | | GEM-4147 | 4TM-S47 | |
| C39 | 10000 | | | BPD-01 | DD-103 | BYA6S1 | ED-01 | DC511 | 5HK-S1 | |
| C40 | 47 | | | NPO-SI 47 | D6-470 | L10Q47 | ED-47 | ZT-5447 | 5TCC-Q47 | 10% |

# PARTS LIST AND DESCRIPTIONS (Continued)

## CAPACITORS (cont)

| ITEM No. | RATING CAP. | RATING VOLT | David Bogen PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | ERIE PART No. | MALLORY PART No. | SPRAGUE PART No. | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| C114 | 22 | | | N750-SI 22 | TCN-22 | CTA6Q22U | TC7-22 | | | N750 |
| C115 | 220 | | | | D6-221 | L10T22 | ED-220 | | MS-322 | ① 10% |
| C116 | .047 | 600 | | P688N-047 | DF-503 | CUB6S47 | | GEM-6147 | GTM-S47 | ① |

① Not used in some versions

## CONTROLS

| ITEM No. | RATING RESISTANCE | RATING WATTS | David Bogen PART No. | CENTRALAB PART No. | CLAROSTAT PART No. | IRC PART No. | MALLORY PART No. | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|
| R1A | Switch | | 14554-3 | | | | | Contour |
| B | 500K | ½ | | | AD47-500K-Z | Q13-133 | | Volume |
| C | 500K | ½ | | | Not Req. | M13-133 | | Volume |
| D | Shaft | | | | FKS-1/2 | Not Req. | | |
| E | Switch | | | | SWE-12 | 76-1 | | On-Off |
| R2A | 1Meg | ½ | V371A | F1-51 | | | UF16L | Bass |
| B | 500K | ½ | | R2-46 | | | UR55-T254 | Treble, Tap ② 250K |
| R3A | 2meg | ½ | V389A | B-75 | A47-2Meg-S | Q11-139 | U56 | Squelch |
| B | Shaft | | | Not Req. | KSS-3 | Not Req. | Not Req. | |
| C | Switch | | | KB-1 | SWE-12 | 76-1 | US-26 | |
| R4A | 500K | ½ | V275A | AB-60 | A47-500K-Z | Q13-133 | U48 | Aux. Adjust |
| B | Shaft | | | AK-1 | FKS-1/4 | RQ | Not Req. | |
| R5A | 50Ω | 2 | V113A | WN-500 | A43-50 | WPK50 | | Hum Adjust (Wirewound) |
| B | Shaft | | | Not Req. | FKS-1/4 | Not Req. | | |

## RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

| ITEM No. | RATING OHMS | RATING WATT | David Bogen PART No. | NOTES |
|---|---|---|---|---|
| R6 | 100K | | | |
| R7 | 1000Ω | | | |
| R8 | 220Ω | | | |
| R9 | 330Ω | | | |
| R10 | 100K | | | |
| R11 | 68Ω | | | |
| R12 | 100K | | | |
| R13 | 1Meg | | | |
| R14 | 100Ω | | | Note 1 |
| R15 | 4700Ω | | | Note 2 |
| R16 | 220Ω | | | |
| R17 | 220K | | | Note 3 |
| R18 | 47K | | | |
| R19 | 100Ω | | | |
| R20 | 820Ω | | | Note 4 |
| R21 | 22K | | | |
| R22 | 120Ω | | | |
| R23 | 1Meg | | | |
| R24 | 220Ω | | | |
| R25 | 220Ω | | | |
| R26 | 22K | | | |
| R27 | 100K | | | Note 3 |
| R28 | 4700Ω | | | |
| R29 | 470Ω | | | Note 5 |
| R30 | 56K | | | Note 3 |
| R31 | 100K | | | |
| R32 | 3300Ω | | | |
| R33 | 220Ω | | | |
| R34 | 1000Ω | | | |
| R35 | 220Ω | | | |
| R36 | 68Ω | | | |
| R37 | 2200Ω | | | Note 6 |
| R38 | 3300Ω | | | |
| R39 | 68Ω | | | |
| R40 | 1Meg | | | |
| R41 | 100K | | | |
| R42 | 22K | | | |
| R43 | 22K | | | |
| R44 | 56K | | | Note 3 |
| R45 | 3300Ω | | | |
| R46 | 68Ω | | | Note 3 |
| R47 | 100K | | | Note 3 |
| R48 | 2.2Meg | | | |
| R49 | 10K | | | |
| R50 | 100K | | | |
| R51 | 22K | | | Note 7 |
| R52 | 150Ω | | | |
| R53 | 100K | | | |
| R54 | 47K | | | |
| R55 | 56K | | | Note 8 |
| R56 | 15K | | | |
| R57 | 100K | | | |
| R58 | 100K | | | |
| R59 | 68K | | | |
| R60 | 220K | | | |
| R61 | 4700Ω | | | |
| R62 | 100K | | | |
| R63 | 1Meg | | | |
| R64 | 150K | | | |
| R65 | 1Meg | | | |
| R66 | 220K | | | |
| R67 | 150K | | | |
| R68 | 10K | | | |
| R69 | 1Meg | | | |
| R70 | 10Meg | | | Note 3 |
| R71 | 47K | | | |
| R72 | 47K | | | |
| R73 | 10Meg | | | Note 9 |
| R74 | 2.2Meg | | | |
| R75 | 150K | | | |
| R76 | 680Ω | | | |
| R77 | 1200Ω | | | |
| R78 | 120K | | | |
| R79 | 2.2Meg | | | |
| R80 | 150K | | | |
| R81 | 150K | | | |
| R82 | 4.7Meg | | | |
| R83 | 220K | | | Note 10 |

# PARTS LIST AND DESCRIPTIONS (Continued)

## CAPACITORS (cont)

| ITEM No. | RATING CAP. | RATING VOLT | David Bogen PART No. | REPLACEMENT DATA AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | ERIE PART No. | MALLORY PART No. | SPRAGUE PART No. | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| C41 | 10000 | | | BPD-01 | DD-103 | BYA6S1 | ED-01 | DC511 | 5HK-S1 | |
| C42 | 10000 | | | BPD-01 | DD-103 | BYA6S1 | ED-01 | DC511 | 5HK-S1 | |
| C43 | 10000 | | | BPD-01 | DD-103 | BYA6S1 | ED-01 | DC511 | 5HK-S1 | |
| C44 | 1500 | | | BPD-0015 | DD-152 | BYA10D15 | ED-0015 | DC5215 | 5HK-D15 | |
| C45 | 10000 | | | BPD-01 | DD-103 | BYA6S1 | ED-01 | DC511 | 5HK-S1 | |
| C46 | 10000 | | | BPD-01 | DD-103 | BYA6S1 | ED-01 | DC511 | 5HK-S1 | |
| C47 | 1500 | | | BPD-0015 | DD-152 | BYA10D15 | ED-0015 | DC5215 | 5HK-D15 | |
| C48 | 1.0 | | | NPO-SI 1.0 | TCZ-1 | | TCO-1.0 | | 5TCCB-V1 | |
| C49 | 10000 | | | BPD-01 | DD-103 | BYA6S1 | ED-01 | DC511 | 5HK-S1 | |
| C50 | 220 | | | NPO-SI 220 | D6-221 | L10T22 | ED-220 | | | 10% |
| C51 | 2700 | | | | DD-272 | BYA10D27 | ED-0027 | UC-5227 | 5GA-D27 | |
| C52 | 10000 | | | BPD-01 | DD-103 | BYA6S1 | ED-01 | DC511 | 5HK-S1 | |
| C53 | 1500 | | | BPD-0015 | DD-152 | BYA10D15 | ED-0015 | DC5215 | 5HK-D15 | |
| C54 | 10000 | | | BPD-01 | DD-103 | BYA6S1 | ED-01 | DC511 | 5HK-S1 | |
| C55 | .047 | 200 | | BPD-05 | DF-503 | CUB2S47 | | GEM-4147 | 4TM-S47 | |
| C56 | 1.0 | | | NPO-SI 1.0 | TCZ-1 | | TCO-1.0 | | 5TCCB-V1 | |
| C57 | 8.2 | | | NPO-SI 8.2 | | C10V82C | TCO-8.2 | | | |
| C58 | 3300 | | | | | | | | | 10% |
| C59 | 3300 | | | | | | | | | 10% |
| C60 | 3300 | | | | | | | | | 10% |
| C61 | 47 | | | NPO-SI 47 | D6-470 | L10Q47 | ED-47 | ZT-5447 | 5TCC-Q47 | 10% |
| C62 | 1000 | | | | | | ED-1000 | | | 10% |
| C63 | 10000 | | | BPD-01 | DD-103 | BYA6S1 | ED-01 | DC511 | 5HK-S1 | ① |
| C64 | 1500 | | | BPD-0015 | DD-152 | BYA10D15 | ED-0015 | DC5215 | 5HK-D15 | |
| C65 | 1.0 | | | NPO-SI 1.0 | TCZ-1 | | TCO-1.0 | | 5TCCB-V1 | |
| C66 | 10 | | | NPO-SI 10 | D6-100 | L10Q1 | ED-10 | ZT-541 | 5TCC-Q1 | 10% |
| C67 | 10000 | | | BPD-01 | DD-103 | BYA6S1 | ED-01 | DC511 | 5HK-S1 | |
| C68 | 1500 | | | BPD-0015 | DD-152 | BYA10D15 | ED-0015 | DC5215 | 5HK-D15 | |
| C69 | 10000 | | | BPD-01 | DD-103 | BYA6S1 | ED-01 | DC511 | 5HK-S1 | |
| C70 | 10 | | | NPO-SI 10 | D6-100 | L10Q1 | ED-10 | ZT-541 | 5TCC-Q1 | 10% |
| C71 | 10000 | | | BPD-01 | DD-103 | BYA6S1 | ED-01 | DC511 | 5HK-S1 | |
| C72 | 10000 | | | BPD-01 | DD-103 | BYA6S1 | ED-01 | DC511 | 5HK-S1 | |
| C73 | 10000 | | | BPD-01 | DD-103 | BYA6S1 | ED-01 | DC511 | 5HK-S1 | |
| C74 | 10000 | | | BPD-01 | DD-103 | BYA6S1 | ED-01 | DC511 | 5HK-S1 | |
| C75 | 100 | | | NPO-SI 100 | D6-101 | L10T1 | ED-100 | ZT-531 | 5TCC-T1 | 10% |
| C76 | 1000 | | | | | | ED-1000 | | | 10% |
| C77 | 10000 | | | BPD-01 | DD-103 | BYA6S1 | ED-01 | DC511 | 5HK-S1 | |
| C78 | 10000 | | | BPD-01 | DD-103 | BYA6S1 | ED-01 | DC511 | 5HK-S1 | |
| C79 | 1000 | | | | | | ED-1000 | | | 10% |
| C80 | 220 | | | NPO-SI 220 | D6-221 | L10T22 | ED-220 | | | 10% |
| C81 | .22 | 200 | | P288N-22 | | CUB2P22 | | GEM-2022 | 2TM-P22 | |
| C82 | 10000 | | | BPD-01 | DD-103 | BYA6S1 | ED-01 | DC511 | 5HK-S1 | |
| C83 | 10 | | | NPO-SI 10 | D6-100 | L10Q1 | ED-10 | ZT-541 | 5TCC-Q1 | 10% |
| C84 | .022 | 200 | | BPD-02 | DD-203 | CUB4S22 | ED-02 | GEM-4122 | 4TM-S22 | |
| C85 | .22 | 200 | | P288N-22 | | CUB2P22 | | GEM-2022 | 2TM-P22 | |
| C86 | 2200 | | | | | | | | | 10% |
| C87 | 1200 | | | | | | ED-1200 | | | 10% |
| C88 | 2200 | | | | | | | | | 10% |
| C89 | 2200 | | | | | | | | | 10% |
| C90 | 1000 | | | | | | ED-1000 | | | 10% |
| C91 | 750 | | | | | | | | | 5% |
| C92 | 620 | | | | | | | | | 10% |
| C93 | 390 | | | | D6-391 | L10T39 | ED-390 | | | 10% |
| C94 | 220 | | | NPO-SI 220 | D6-221 | L10T22 | ED-220 | | | 10% |
| C95 | 3900 | | | | | | | | | 10% |
| C96 | .1 | 200 | | P288N-1 | DF-104 | CUB2P1 | | GEM-201 | 2TM-P1 | |
| C97 | 2700 | | | | | | | | | 10% |
| C98 | 1000 | | | | | | ED-1000 | | | 10% |
| C99 | 1500 | | | | | | ED-1500 | | | 10% |
| C100 | 2700 | | | | | | | | | 10% |
| C101 | 620 | | | | | | | | | 10% |
| C102 | 220 | | | NPO-SI 220 | D6-221 | L10T22 | ED-220 | | | 10% |
| C103 | .22 | 200 | | P288N-22 | | CUB2P22 | | GEM-2022 | 2TM-P22 | |
| C104 | .047 | 200 | | BPD-05 | DF-503 | CUB2S47 | | GEM-4147 | 4TM-S47 | |
| C105 | .022 | 200 | | BPD-02 | DD-203 | CUB4S22 | ED-02 | GEM-4122 | 4TM-S22 | |
| C106 | .1 | 200 | | P288N-1 | DF-104 | CUB2P1 | | GEM-201 | 2TM-P1 | |
| C107 | .01 | 200 | | BPD-01 | DD-103 | CUB4S1 | GP-10000 | GEM-411 | 4TM-S1 | |
| C108 | .1 | 200 | | P288N-1 | DF-104 | CUB2P1 | | GEM-201 | 2TM-P1 | |
| C109 | 10000 | | | BPD-01 | DD-103 | BYA6S1 | ED-01 | DC511 | 5HK-S1 | |
| C110 | 10 | | | NPO-SI 10 | D6-100 | L10Q1 | ED-10 | ZT-541 | 5TCC-Q1 | 10% |
| C111 | .047 | 400 | | BPD-05 | DF-503 | CUB4S47 | | GEM-4147 | 4TM-S47 | |
| C112 | 10000 | | | BPD-01 | DD-103 | BYA6S1 | ED-01 | DC511 | 5HK-S1 | |
| C113 | .1 | 200 | | P288N-1 | DF-104 | CUB2P1 | | GEM-201 | 2TM-P1 | |

# PARTS LIST AND DESCRIPTIONS (Continued)

## RESISTORS (cont)

| ITEM No. | RATING OHMS | RATING WATT | David Bogen PART No. | NOTES |
|---|---|---|---|---|
| R84 | 3300Ω | | | |
| R85 | 470K | | | |
| R86 | 1Meg | | | |
| R87 | 1Meg | | | |
| R88 | 220K | | | Note 10 |
| R89 | 5600Ω | | | |
| R90 | 47K | | | |
| R91 | 120K | | | |
| R92 | 100K | | | |
| R93 | 22K | | | |
| R94 | 47K | | | |
| R95 | 1500Ω | | | |
| R96 | 2700Ω | | | |
| R97 | 39K | | | |
| R98 | 10Meg | | | |
| R99 | 330K | | | |
| R100 | 180K | | | |
| R101 | 1.5Meg | | | |
| R102 | 1.5Meg | | | |
| R103 | 180K | | | |
| R104 | 47K | | | |

| ITEM No. | RATING OHMS | RATING WATT | David Bogen PART No. | NOTES |
|---|---|---|---|---|
| R105 | 1200Ω | | | |
| R106 | 100K | | | |
| R107 | 1500Ω | | | |
| R108 | 1Meg | | | |
| R109 | 100K | | | |
| R110 | 2200Ω | | | |
| R111 | 100K | | | |
| R112 | 22K | | | |
| R113 | 150Ω | 1 | | |
| R114 | 150Ω | 1 | | Note 3 |
| R115 | 1000Ω | | | |
| R116A | 500Ω | 5 | | |
| B | 500Ω | 5 | | |
| C | 500Ω | 5 | | |
| R117 | 10K | | | |
| R118 | 4700Ω | | | |
| R119 | 150Ω | 2 | | |
| R120 | 100K | | | Note 3 |
| R121 | 100K | | | Note 3 |
| R122 | 150K | | | |

Note 1. Some versions may use 10Ω.
Note 2. Some versions may use 220Ω.
Note 3. Not used in some versions.
Note 4. Some versions may use 330Ω.
Note 5. Some versions may use 3300Ω.
Note 6. Some versions may use 270Ω.
Note 7. Some versions may use 47K.
Note 8. Some versions may use 33K.
Note 9. Some versions may use 4.7Meg.
Note 10. Special low noise deposited carbon resistor.

## TRANSFORMER (POWER)

| ITEM No. | RATING PRI. | RATING SEC. 1 | RATING SEC. 2 | RATING SEC. 3 | REPLACEMENT DATA David Bogen PART No. | Halldorson PART No. | Merit PART No. | Stancor PART No. | Thordarson PART No. | Triad PART No. |
|---|---|---|---|---|---|---|---|---|---|---|
| T1 | 117VAC @ .66A | 440VCT @ .068A | 5VAC @ .86A | 6.3VAC @ 3.7A | T3138 | | | P-8155 | | |

## COILS (RF-IF)

| ITEM No. | USE | REPLACEMENT DATA David Bogen PART No. | MEISSNER PART No. | MERIT PART No. | MILLER PART No. | NOTES |
|---|---|---|---|---|---|---|
| L1 | FM Ant. Trans. | U452 | | | | |
| L2 | FM Coupling Coil | U457 | 19-1000 | BC-561 | 4602 | 1.1 Microhenry |
| L3 | RF Choke | U420 | 19-1001 | BC-562 | 4604 | 1.7 Microhenry |
| L4 | Cathode Choke | U420 | 19-1001 | BC-562 | 4604 | 1.7 Microhenry |
| L5 | RF Choke | U514 | | | | Wound on 47Ω |
| L6 | RF Choke | U420 | 19-1001 | BC-562 | 4604 | 1.7 Microhenry |
| L7 | FM RF Coil | U441 | | | | |
| L8 | FM Mixer Coil | U451 | | | | |
| L9 | FM Osc. Coil | U435 | | | | |
| L10 | RF Choke | U432 | 19-1000 | BC-561 | 4602 | 1.1 Microhenry |
| L11 | RF Choke | U507 | | | | 3.3 Microhenries; IRC part #CLA |
| L12 | Loop Stick | U304 | | | | |
| L13 | AM RF Coil | H469 | 14-1411 | | | |
| L14 | AM Osc. Coil | H454 | | | | |
| L15 | 1st FM IF | H294 | 16-3487 | FM-254 | 1463 | |
| L16 | 2nd FM IF | H355 | 16-3487 | FM-254 | 1463 | |
| L17 | 1st AM IF | H368 | | | | |
| L18 | 3rd FM IF | H355 | 16-3487 | FM-354 | 1463 | |
| L19 | 2nd AM IF | H297 | 16-6758 | BC-353 | 12-C2 | |
| L20 | 10KC Filter | U207 | | | | |
| L21 | 4th FM IF | H355 | 16-3487 | FM-254 | 1463 | |
| L22 | FM Limiter | H371 | | | | |
| L23 | FM Discriminator | H295 | 17-3494 | FM-253 | 1464 | |
| L24 | Line Choke | U512 | | | | 1.9 Microhenry |
| L25 | Line Choke | U512 | | | | 1.9 Microhenry |
| L26 | Fil. Choke | U511 | 19-1001 | BC-562 | 4604 | 1.8 Microhenry |
| L27 | Fil. Choke | U501 | 19-1000 | BC-561 | 4602 | 1 Microhenry; IRC part #CLA |

# PARTS LIST AND DESCRIPTIONS (Continued)

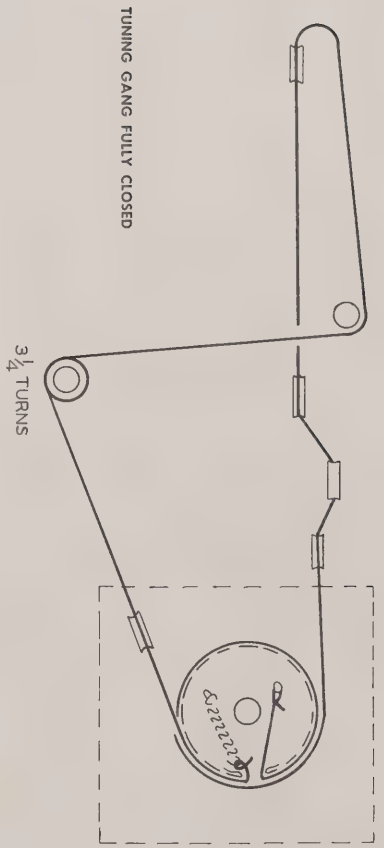
## COMPONENT COMBINATIONS

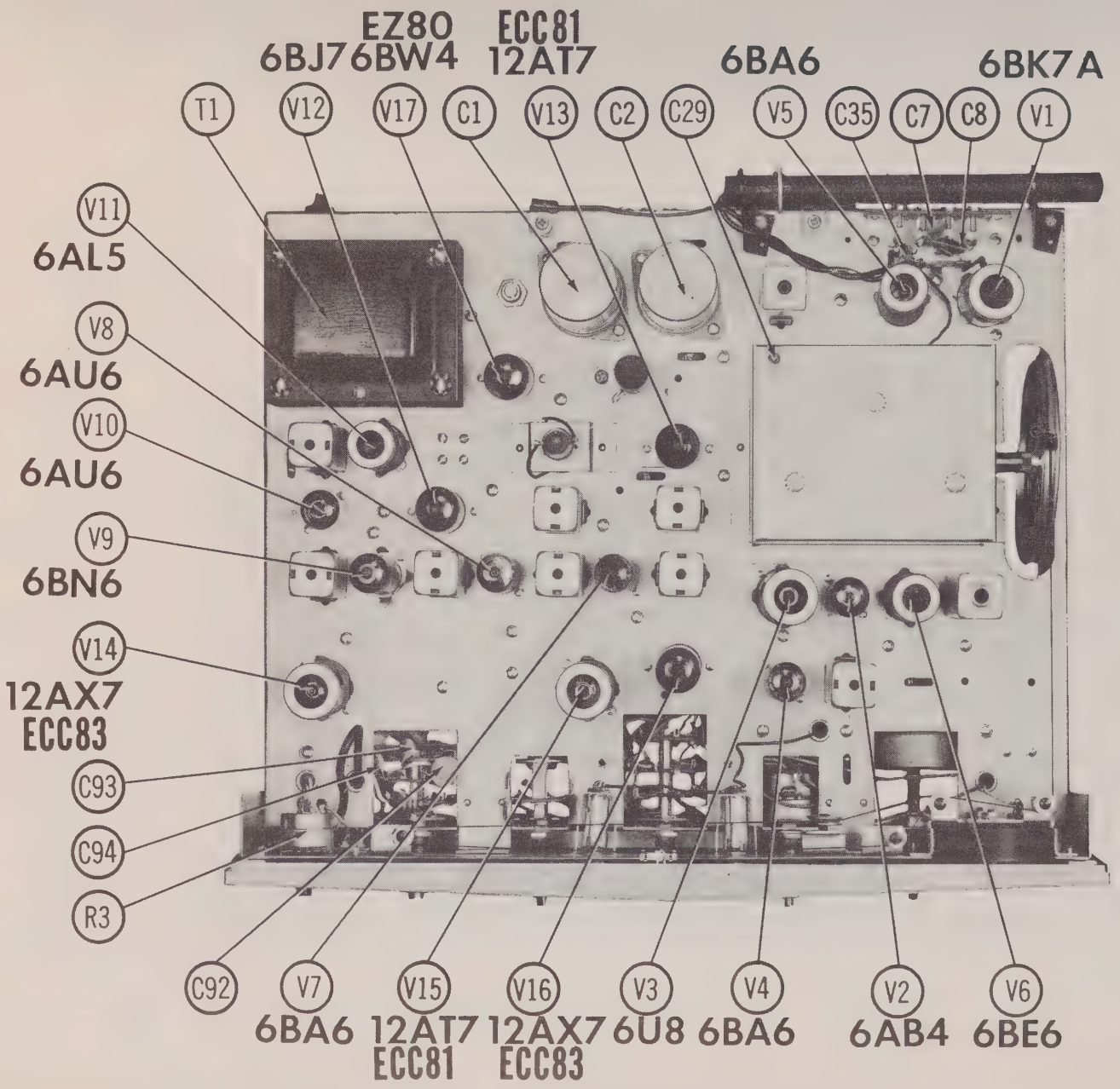
| ITEM No. | USE | DESCRIPTION | David Bogen PART No. | REPLACEMENT DATA | |
|---|---|---|---|---|---|
| K1 | Diode RF Filter | 100MMF, 100MMF, 47K | C325 | Aerovox<br>Centralab<br>Cornell-Dubilier<br>Erie<br>Sprague | PA-97-1<br>PC-50<br>111TM1<br>1403-01<br>D-1 |
| K2 | Audio Couplate | 4700MMF, 4700MMF, 100MMF 100K, 100K, 470K, 1000Ω | C392 | Centralab | PC-190 |
| K3 | Audio Couplate | 100K, 100K, 100K, 47MMF | C419 | Sprague | 102C22 |
| K4 | Audio Couplate | 4700MMF, 2200MMF, 150MMF, 270K, 220K, 47K, 47K | C420 | Sprague | 104C11 |

## MISCELLANEOUS

| ITEM No. | PART NAME | David Bogen PART No. | NOTES |
|---|---|---|---|
| M1 | Pilot Lamp | | #51 (Alternate Type #47) |
| M2 | Pilot Lamp | | #51 (Alternate Type #47) |
| M3 | Neon Lamp | | Auto-Lock NE51 |
| M4 | Neon Lamp | | AM NE51 (Not used in some versions) |
| M5 | Neon Lamp | | FM NE51 (Not used in some versions) |
| M6 | Tuning Cap. | C642 | AM-FM, 6 Gang (AM Sections: Ant. 35-517MMF, RF 35-517MMF, Osc. 32-192MMF) |
| M7 | Switch | S475 | Lo Filter, Slide Type DPDT |
| M8 | Switch | S475 | Hi Filter, Slide Type DPDT |
| M9 | Switch | S465 | Equalizer, Rotary Wafer Type |
| M10 | Switch | S444B | Selector, Rotary Wafer Type |
| M11 | Relay | H440 | AFC |
| M12 | Meter | H453 | AM-FM Tuning Indicator |

## DIAL CORD STRINGING






CHASSIS TOP VIEW - TUBE & CAPACITOR IDENTIFICATION

# RESISTANCE MEASUREMENTS

| ITEM | TUBE | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 | Pin 8 | Pin 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| V1 | 6BK7A | †1500Ω | 1.2Meg | 0Ω | 0Ω | .1Ω | †1700Ω | 100K | 68Ω | 0Ω |
| V2 | 6AB4 | †6000Ω | 0Ω | .1Ω | 0Ω | 0Ω | 2.2Meg | 0Ω | | |
| V3 | 6U8 | †1100Ω | 2Meg | †1200Ω | 0Ω | .1Ω | †1100Ω | 820Ω | 0Ω | 22K |
| V4 | 6BA6 | 1.2Meg | 0Ω | .1Ω | 0Ω | † 4500Ω | † 2400Ω | 68Ω | | |
| V5 | 6BA6 | ▲1.6Meg | 0Ω | 0Ω | .1Ω | ▲† 1700Ω | ▲† 1600Ω | 0Ω | | |
| V6 | 6BE6 | 22K | .3Ω | .1Ω | 0Ω | ▲† 1600Ω | ▲† 6200Ω | ■ 680K | | |
| V7 | 6BA6 | 1Meg | 0Ω | 0Ω | .1Ω | †4500Ω | †6500Ω | 68Ω | | |
| V8 | 6AU6 | 147K | 0Ω | 0Ω | .1Ω | †4300Ω | †4300Ω | 68Ω | | |
| V9 | 6BN6 | 150Ω | 100K | 0Ω | .1Ω | †23K | 1.3Meg | †100K | | |
| V10 | 6AU6 | 100K | 0Ω | 0Ω | .1Ω | †48K | †35K | 0Ω | | |
| V11 | 6AL5 | 200K | 100K | .1Ω | 0Ω | 0Ω | NC | 100K | | |
| V12 | 6BJ7 | 1.2Meg | 5Meg | 0Ω | .1Ω | 0Ω | 15K | 170K | 150K | 160K |
| V13 | 12AT7 | †3300Ω | 5Meg | 0Ω | .1Ω | .1Ω | †0Ω | 1.1Meg | 600Ω | 0Ω |
| V14 | 12AX7 | †320K | 100K | 3300Ω | 3000Ω | 3000Ω | †320K | 1Meg | 5600Ω | 3000Ω |
| V15 | 12AT7 | †70K | 500K | 1500Ω | 3000Ω | 3000Ω | †70K | 1Meg | 1200Ω | 3000Ω |
| V16 | 12AX7 | †100K | 600K | 1500Ω | 3000Ω | 3000Ω | † 1500Ω | 1.1Meg | 100K | 3000Ω |
| V17 | 6BW4/ EZ80 | 240Ω | TP | 20K(Min) | 0Ω | .1Ω | NC | 240Ω | NC | 20K(Min) |

ALL MEASUREMENTS TAKEN IN "FM" POSITION UNLESS OTHERWISE DESIGNATED

† MEASURED FROM PIN 3 OF V17

■ MEASURED FROM PIN 8 OF V16

▲ MEASURED IN "AM" POSITION

NC NO CONNECTION

TP TIE POINT

# ALIGNMENT INSTRUCTIONS

**ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT**

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.
Remove 12AT7 (V13).

AM ALIGNMENT

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | BAND SWITCH POS. | RADIO DIAL SETTING | CONNECT VTVM | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 1. | .01MFD | High side to pin 7 (grid) of 6BE6 (V6). Low side to chassis. | 455KC (400∿ Mod) | AM (Normal) | Tuning gang fully open | DC probe to point Ⓐ. Common to chassis. | A1, A2, A3, A4 | Adjust for maximum deflection. |
| 2. | 200MMF | High side to AM antenna terminal. Low side to chassis. | 600KC | " | 600KC | " | A5, A6, A7 | " |
| 3. | " | " | 1500KC | " | Tune to 1500KC signal | | A8, A9, A10 | Adjust for maximum deflection. Repeat steps 2 & 3. |
| | | | 10KC FILTER ADJUSTMENT | | | | | |
| 4. | .01MFD | High side to pin 7 (grid) of 6BE6 (V6). Low side to chassis. | 455KC (10KC Mod) | AM (Normal) | | AC probe across main output. | A11 | Adjust for MINIMUM deflection. |

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | BAND SWITCH POS. | RADIO DIAL SETTING | CONNECT VTVM | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 5. | Fig. 1 | Thru dummy to FM antenna terminals. | 10.7MC (Unmod.) | FM | Point of non-interference | DC probe thru 100K to point Ⓑ. Common to chassis. | A12, A13, A14, A15, A16, A17, A18, A19 | Adjust for maximum deflection. |
| 6. | " | " | " | " | " | DC probe thru 100K to point Ⓒ. Common to chassis. | A20, A21 | " |
| 7. | " | " | " | " | " | DC probe thru 100K to point Ⓓ. Common to chassis. | A22 | Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. |

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | BAND SWITCH POS. | RADIO DIAL SETTING | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 5. | Fig. 1 | Thru dummy to FM antenna terminals. | 10.7MC (450KC Swp) | FM | Point of non-interference | Vert. Amp. thru 100K to point Ⓑ. Common to chassis. | A12, A13, A14, A15, A16, A17, A18, A19 | Adjust for curve of maximum amplidude and symmetry similar to Fig. 2. |
| 6. | " | " | " | " | " | Vert. Amp. thru 100K to point Ⓒ. Common to chassis.. | A20, A21 | " |
| 7. | " | " | " | " | " | Vert. Amp. to point Ⓓ. Common to chassis. | A22 | Adjust so that 10.7MC occurs at center of crossover lines similar to Fig. 3. SLIGHTLY retouch A21 for maximum amplitude and straightness of crossover lines. |

FM RF ALIGNMENT

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | BAND SWITCH POS. | RADIO DIAL SETTING | CONNECT VTVM | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 8. | Fig. 1 | Thru dummy to FM antenna terminals. | 106MC | FM | 106MC | DC probe thru 100K to point Ⓑ. Common to chassis. | A23, A24, A25 | Adjust for maximum deflection. |
| 9. | " | " | 90MC | " | 90MC | " | L9, L8, L7 | Adjust for maximum deflection (if necessary) by compressing or expanding coil turns. Repeat step 8 & 9. Check tracking. |

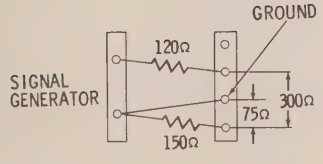


FIG. 1

FIG. 2

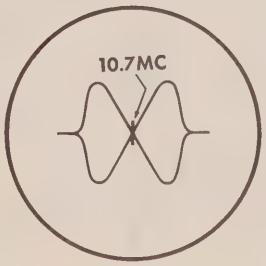
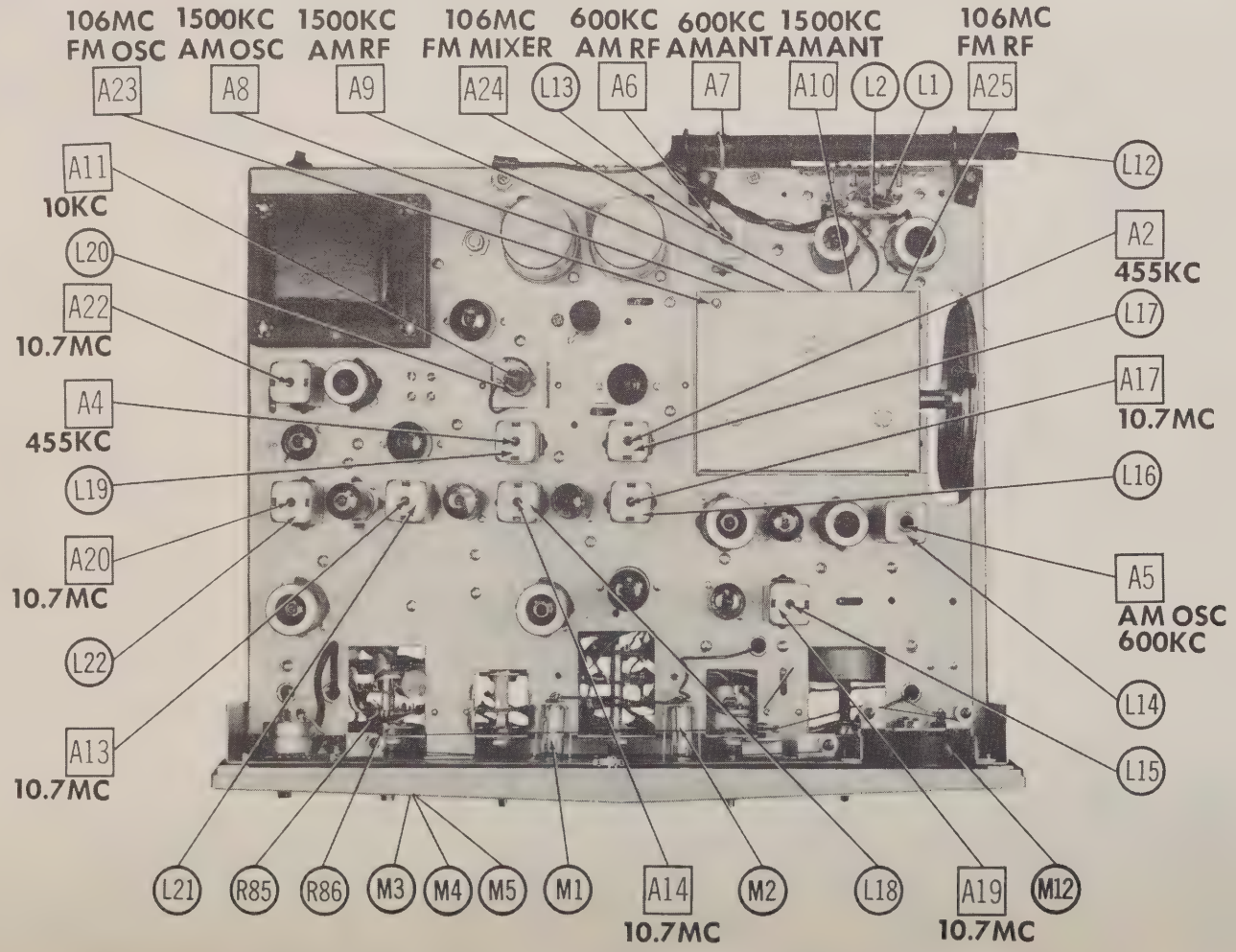
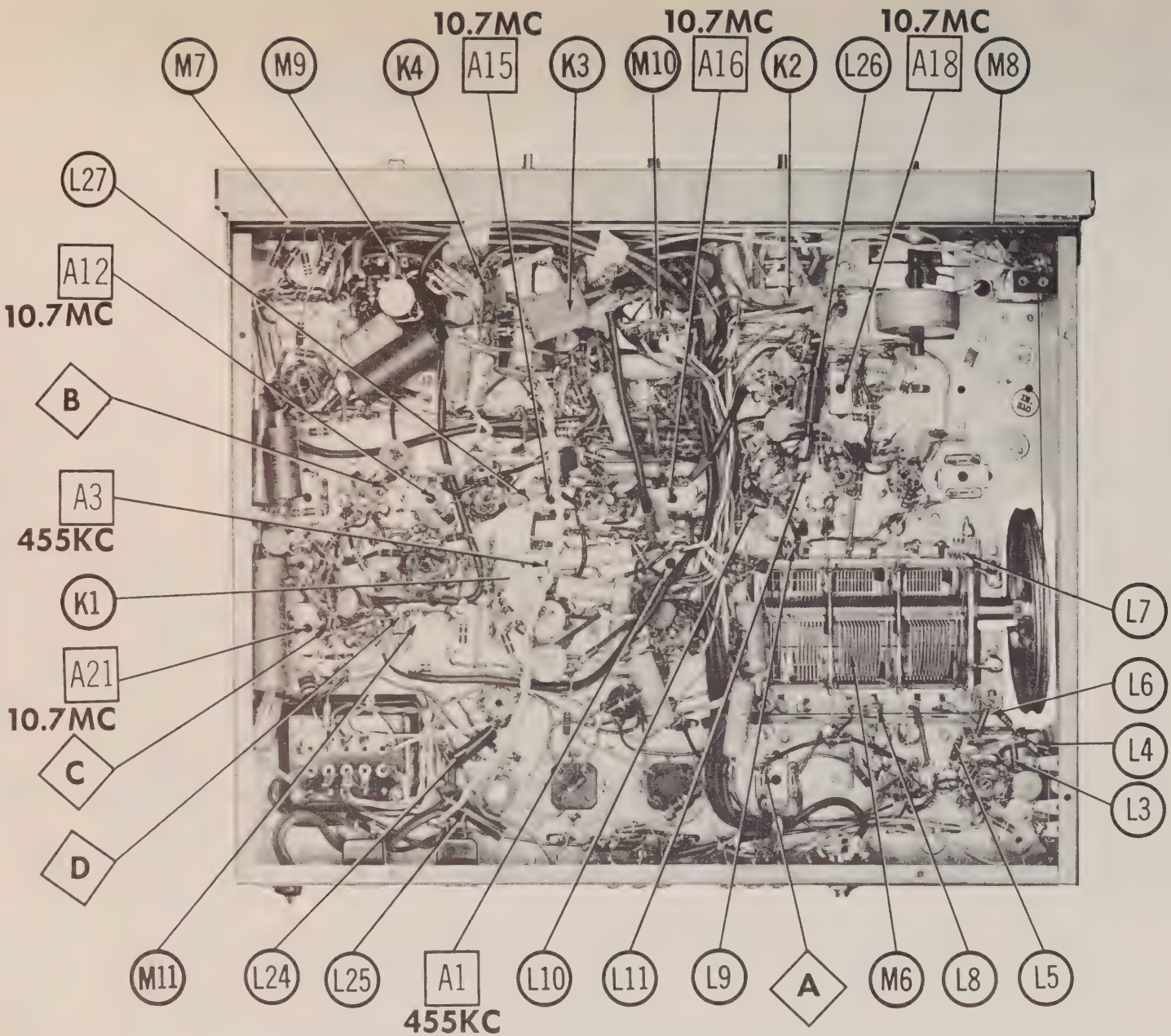


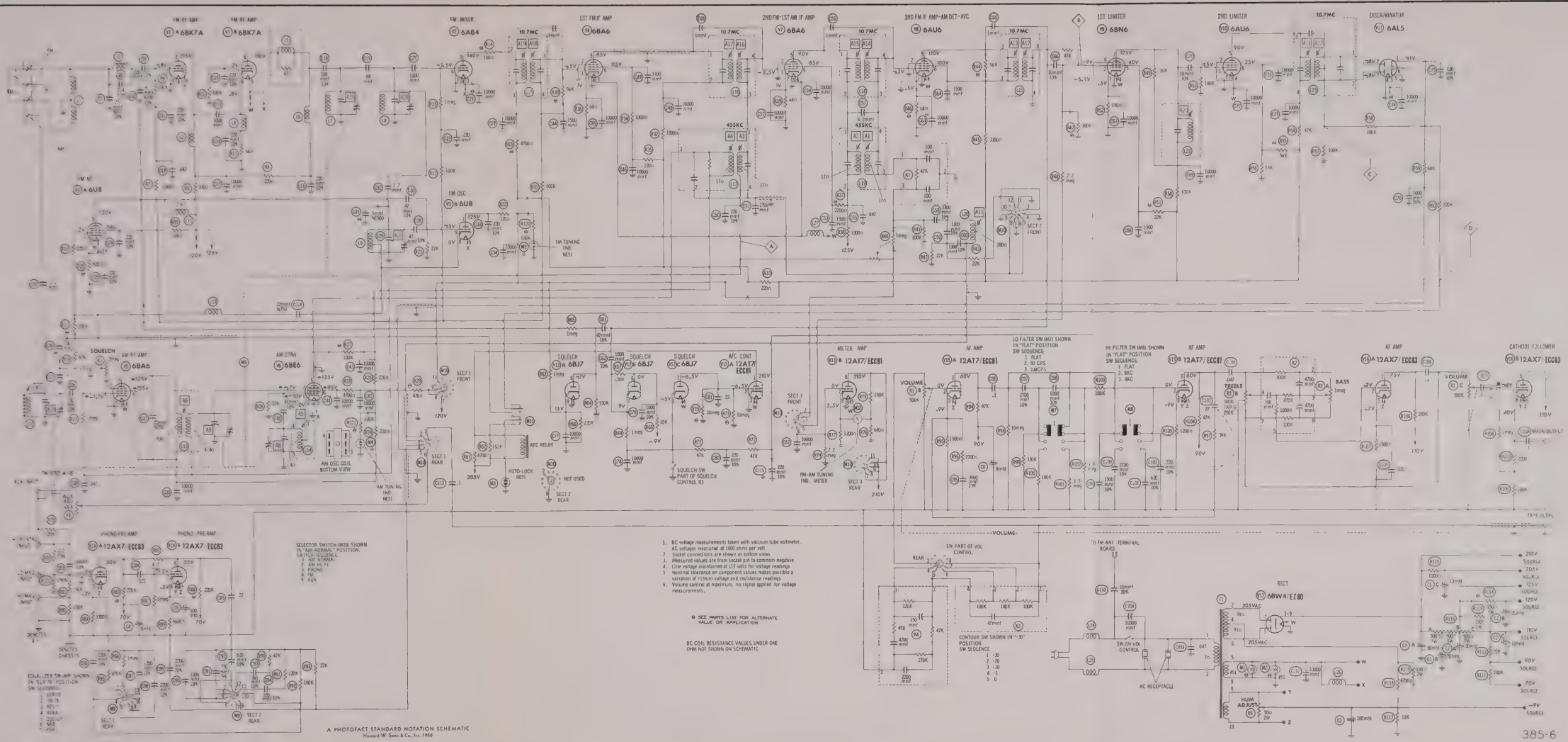
FIG. 3




CHASSIS TOP VIEW - ALIGNMENT IDENTIFICATION




CHASSIS BOTTOM VIEW - ALIGNMENT IDENTIFICATION


FM RF AMP
FM MIXER
1ST FM IF AMP
2ND FM-1ST AM IF AMP
3RD FM IF AMP-AM DET-AVC
1ST LIMITER
2ND LIMITER
DISCRIMINATOR
FM OSC
AM RF AMP
AM OSC
SQUELCH
AFC CONT
METER AMP
AF AMP
CATHODE FOLLOWER
PHONO PRE AMP
EQUALIZER
RECT
10.7MC
455KC
VOLUME
TREBLE
BASS
SELECTOR SWITCH
AM TUNING IND NE51
FM TUNING IND NE51
AFC RELAY
AUTO-LOCK NE51
SQUELCH SW PART OF SQUELCH CONTROL R3
SW ON VOL CONTROL
AC RECEPTACLE
HUM ADJUST
TAPE OUTPUT
MAIN OUTPUT
A PHOTOFACT STANDARD NOTATION SCHEMATIC
Howard W. Sams & Co., Inc. 1958
385-6

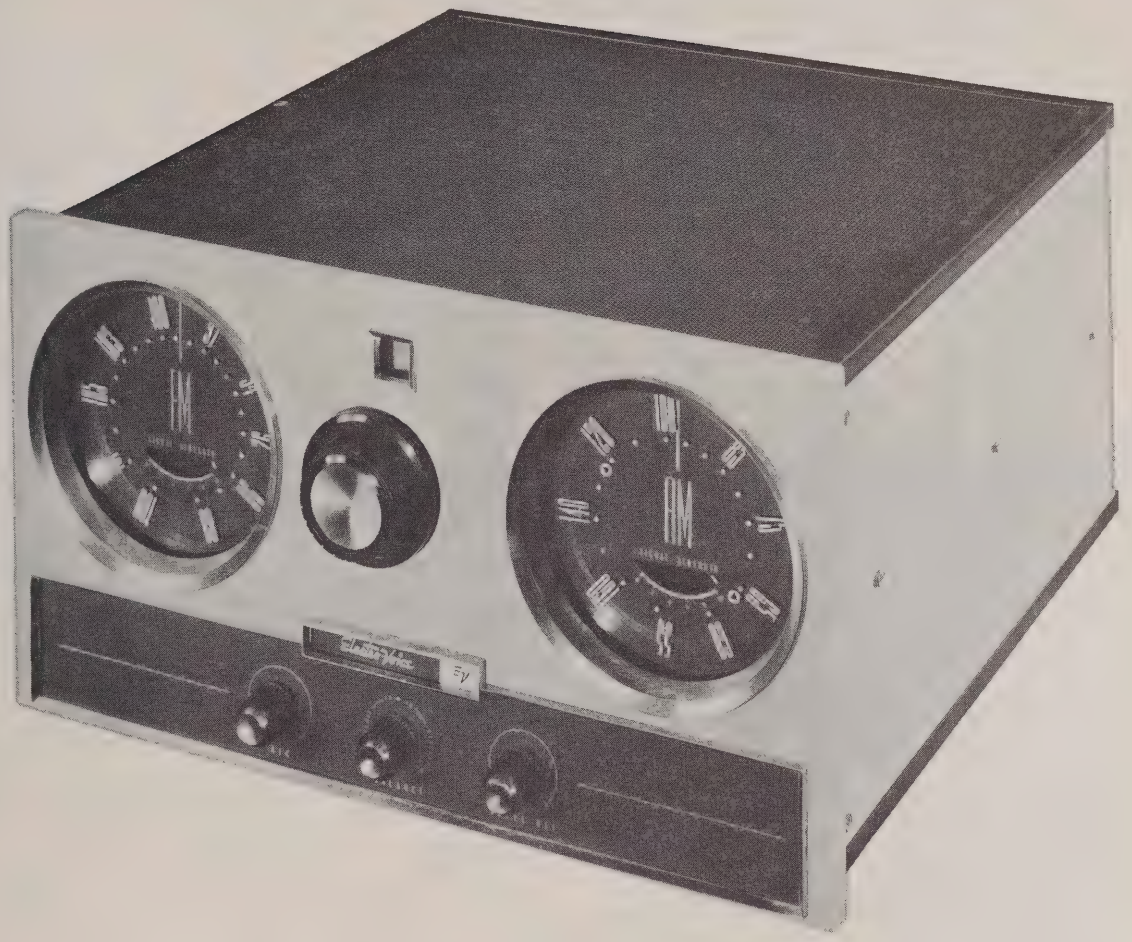
PHOTOFACT* Folder

*TRADE MARK

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

# ELECTRO-VOICE MODEL 3304

ELECTRO-VOICE MODEL 3304



ELECTRO-VOICE MODEL 3304

| | | | |
|---|---|---|---|
| TRADE NAME | Electro-Voice Model 3304 | | |
| MANUFACTURER | Electro-Voice, Inc., Buchanan, Michigan | | |
| TYPE SET | AC Operated FM-AM Tuner | | |
| TUBES | Sixteen | | |
| POWER SUPPLY | 105-125 Volts AC-60 Cycles | RATING | .83 Amp. @ 117 Volts AC (90 Watts) |
| TUNING RANGE—BROADCAST | 550KC - 1600KC | FREQ. MOD. | 88MC - 108MC |

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

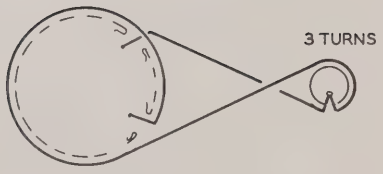
The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1958 Howard W. Sams & Co., Inc., Indianapolis 5, Indiana. Printed in U.S. of America

# RESISTANCE MEASUREMENTS

| ITEM | TUBE | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 | Pin 8 | Pin 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| V1 | 6BK7A | †450Ω | 0Ω | 820Ω | 0Ω | .1Ω | †1000Ω | 1.1Meg | 56Ω | 0Ω |
| V2 | 6U8 | †9400Ω | 1.2Meg | † 1200Ω | .1Ω | 0Ω | †1200Ω | 0Ω | 0Ω | 12K |
| V3 | 6J6 | †18K | †18K | 0Ω | .1Ω | 120Ω | 120Ω | 470Ω | | |
| V4 | 6BA6 | 1.2Meg | 0Ω | .1Ω | 0Ω | †700Ω | †18K | 68Ω | | |
| V5 | 6BA6 | 1.5Meg | 0Ω | .1Ω | 0Ω | †450Ω | †18K | 68Ω | | |
| V6 | 6AU6 | 100K | 0Ω | .1Ω | 0Ω | †12K | †20K | 0Ω | | |
| V7 | 6AU6 | 27K | 0Ω | .1Ω | 0Ω | †12K | †16K | 0Ω | | |
| V8 | 6AL5 | 0Ω | 120K | 0Ω | .1Ω | 240K | 0Ω | 120K | | |
| V9 | 12AT7 | †470K | 1.2Meg | 0Ω | .1Ω | .1Ω | †22K | †1Meg | 7000Ω | 0Ω |
| V10 | 6AL7 | 3300Ω | .1Ω | †0Ω | 0Ω | 330K | 1.1Meg | 0Ω | 3300Ω | |
| V11 | 6BA6 | 1.7Meg | 0Ω | 0Ω | .1Ω | †250Ω | †18K | 68Ω | | |
| V12 | 6BE6 | 22K | .1Ω | 0Ω | .1Ω | †170Ω | †7800Ω | 1.6Meg | | |
| V13 | 6AU6 | 2Meg | 0Ω | 0Ω | .1Ω | †1500Ω | †20K | 68Ω | | |
| V14 | 12AT7 | †470K | 1.8Meg | 0Ω | 0Ω | 0Ω | † 24K | 1Meg | 8200Ω | .1Ω |
| V15 | 12AX7 | †180K | 85Ω | 2700Ω | 0Ω | 0Ω | †180K | 270K | 2700Ω | .1Ω |
| V16 | 5Y3GT | NC | 20K(MIN) | NC | 4Ω | NC | 39Ω | NC | 20K(MIN) | |

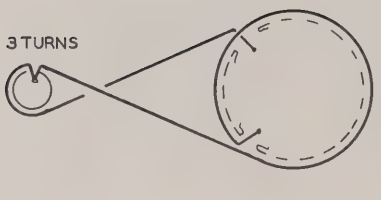
† MEASURED FROM PIN 8 OF V 16
NC NO CONNECTION

FM



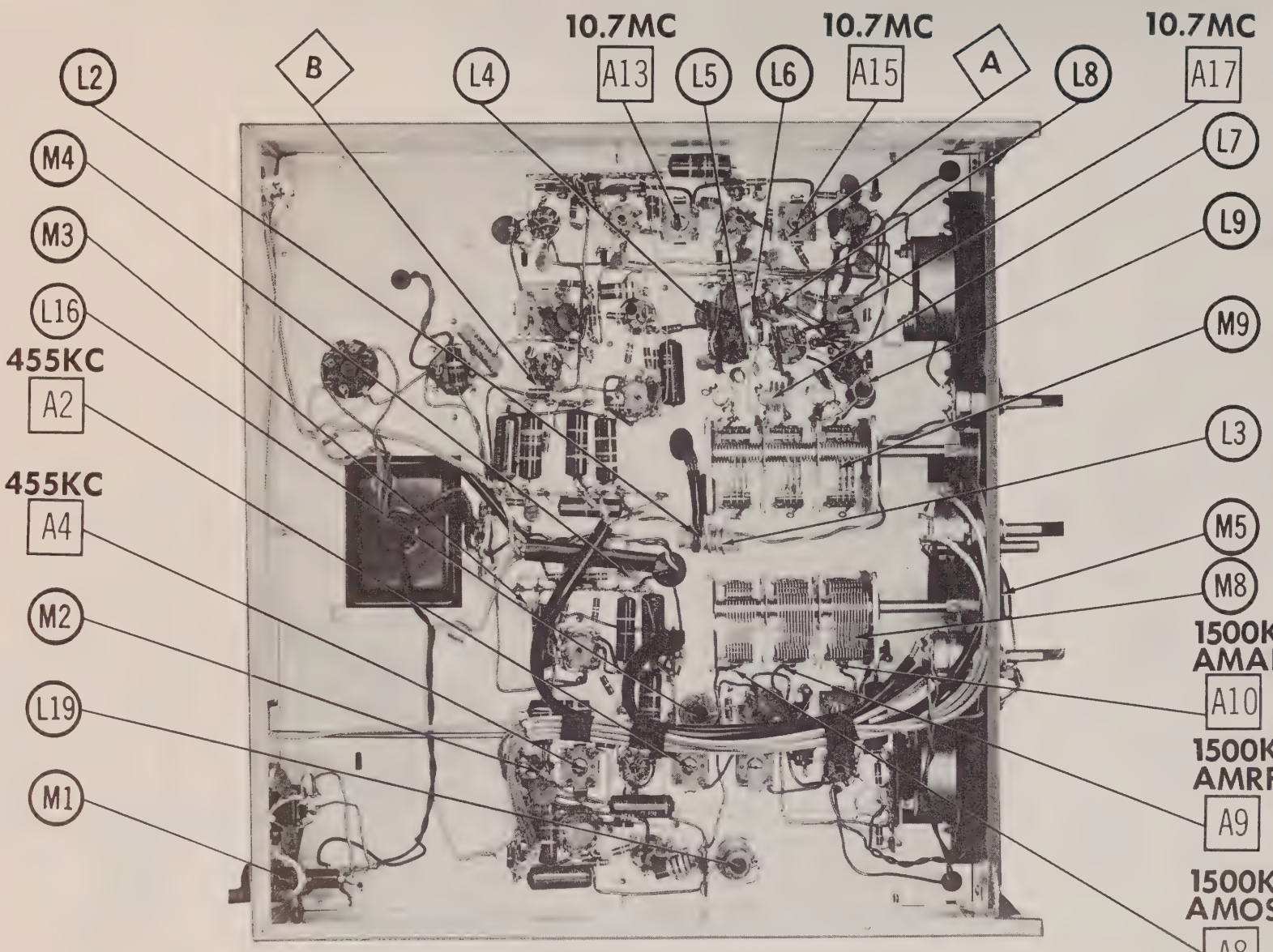

TUNING GANG FULLY CLOSED

AM




TUNING GANG FULLY CLOSED

# DIAL CORD STRINGING

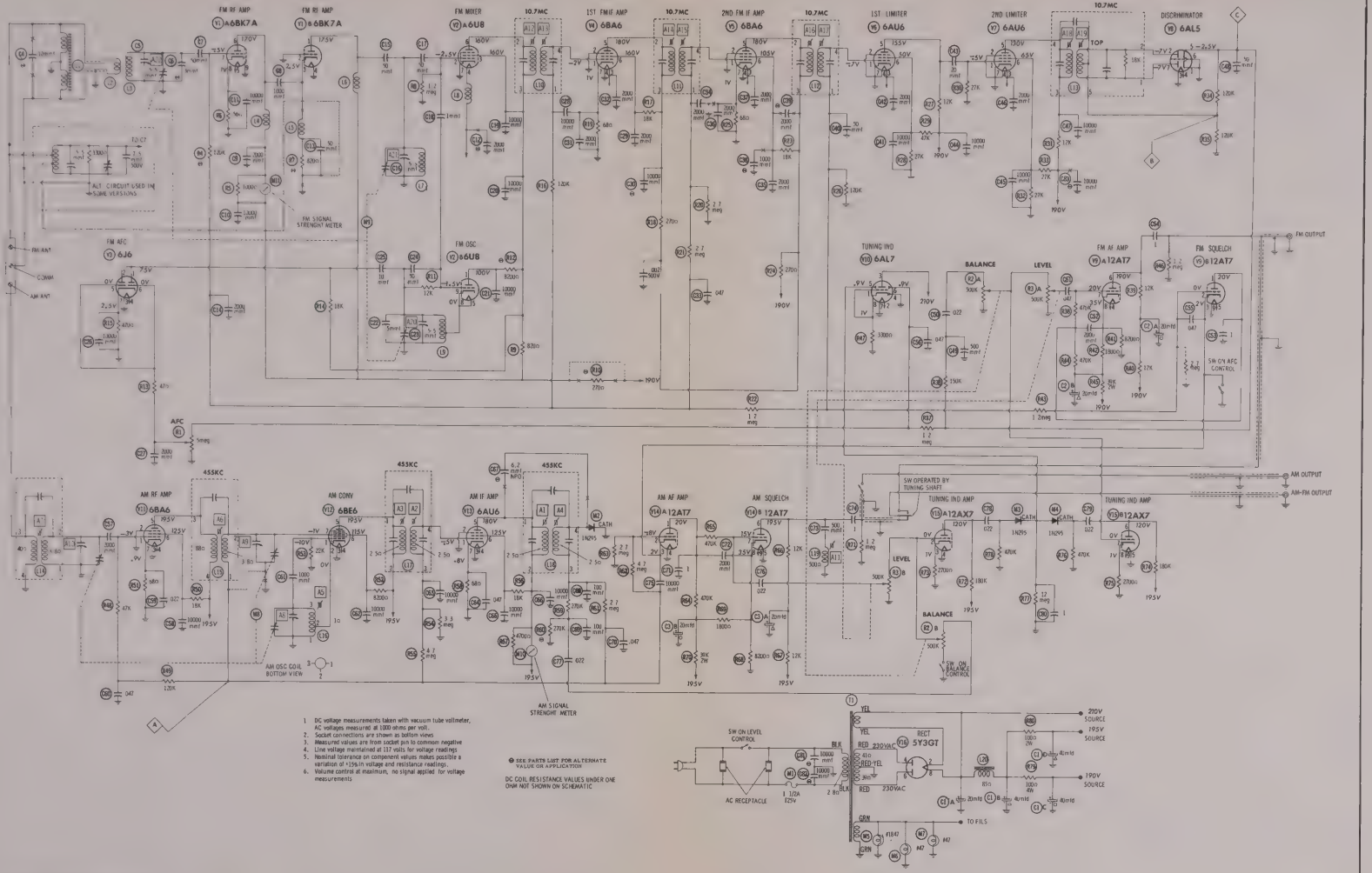



CHASSIS BOTTOM VIEW- INDUCTOR AND ALIGNMENT IDENTIFICATION

PROPERTY OF
L.F. RUNYON



ELECTRO-VOICE
MODEL 3304




A PHOTOFACT STANDARD NOTATION SCHEMATIC
Howard W. Sams & Co., Inc. 1958

385-7

# ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.
Use an insulated alignment screwdriver for adjusting.
To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.

AM ALIGNMENT

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | BAND SWITCH POS. | RADIO DIAL SETTING | OUTPUT METER | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 1. | .01MFD | High side to pin 7 (grid) of 6BE6 (V12). Low side to chassis. | 455KC (400∿ Mod) | AM | Point of non-interference | DC probe to point (A). Common to chassis. | A1, A2, A3 | Insert 10K shunt across A4. Adjust A1, A2, A3 for maximum deflection. |
| 2. | " | " | " | " | " | " | A4 | Remove shunt from A4 and insert across A1. Adjust A4 for maximum deflection. Remove 10K shunt. |
| 3. | 250Ω Carbon Resistor | Thru dummy to AM Antenna terminal. Low side to "C" terminal. | 600KC | " | 600KC | " | A5, A6, A7 | Adjust for maximum deflection. |
| 4. | " | " | 1500KC | " | 1500KC | " | A8, A9, A10 | Adjust for maximum deflection. Repeat steps 3 & 4 until signal generator frequency and dial coincide. |
| | | | WHISTLE FILTER ADJUSTMENT | | | | | |
| 5. | .01MFD | High side to pin 7 (grid) of 12AT7 (V14). Low side to chassis. | 10KC | " | Point of non-interference | AC VTVM across AM Output Jack | A11 | Squelch Switch off. Adjust for MINIMUM deflection. |

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | BAND SWITCH POS. | RADIO DIAL SETTING | CONNECT VTVM | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 6. | .01MFD | High side to pin 2 (grid) of 6U8 (V2). Low side to chassis. | 10.7MC (Unmod) | FM (Squelch off) | Point of non-interference | DC probe to point (B). Common to chassis. | A12, A13 A14, A15 A16, A17 A18 | Adjust for maximum deflection. |
| 7. | " | " | " | " | " | DC probe to point (C). Common to chassis. | A19 | Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. |

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | BAND SWITCH POS. | RADIO DIAL SETTING | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 6. | .01MFD | High side to pin 2 (grid) of 6U8 (V2). Low side to chassis. | 10.7MC (300KC Swp) | FM (Squelch off) | Point of non-interference | Vert. Amp. thru 1Meg to point (B). Low side to chassis. | A12, A13 A14, A15 A16, A17 A18 | Short AVC Line to chassis. Adjust for curve of maximum amplitude and symmetry similar to Fig. 1. |
| 7. | " | " | " | " | " | Vert. Amp. thru 1Meg to point (C). Low side to chassis. | A19 | Remove short from AVC Line. Adjust so that 10.7MC occurs at center of cross-crossover lines similar to Fig. 2. SLIGHTLY retouch A18 for maximum amplitude and straightness of crossover lines. |

FM RF ALIGNMENT

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | BAND SWITCH POS. | RADIO DIAL SETTING | CONNECT VTVM | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 8. | 270Ω Carbon Resistor | High side thru 270Ω to FM Antenna terminal. Low side to "C" terminal. | 88MC | FM (AFC fully on) | 88MC | DC probe to point (B). Common to chassis. | L9, L8, L7 | Adjust for maximum deflection by expanding or compressing coil turns. |
| 9. | " | " | 106MC | FM (Squelch off) | 106MC | " | A20, A21 A22 | Adjust for maximum deflection. |

FIG. 1

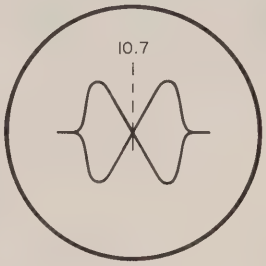
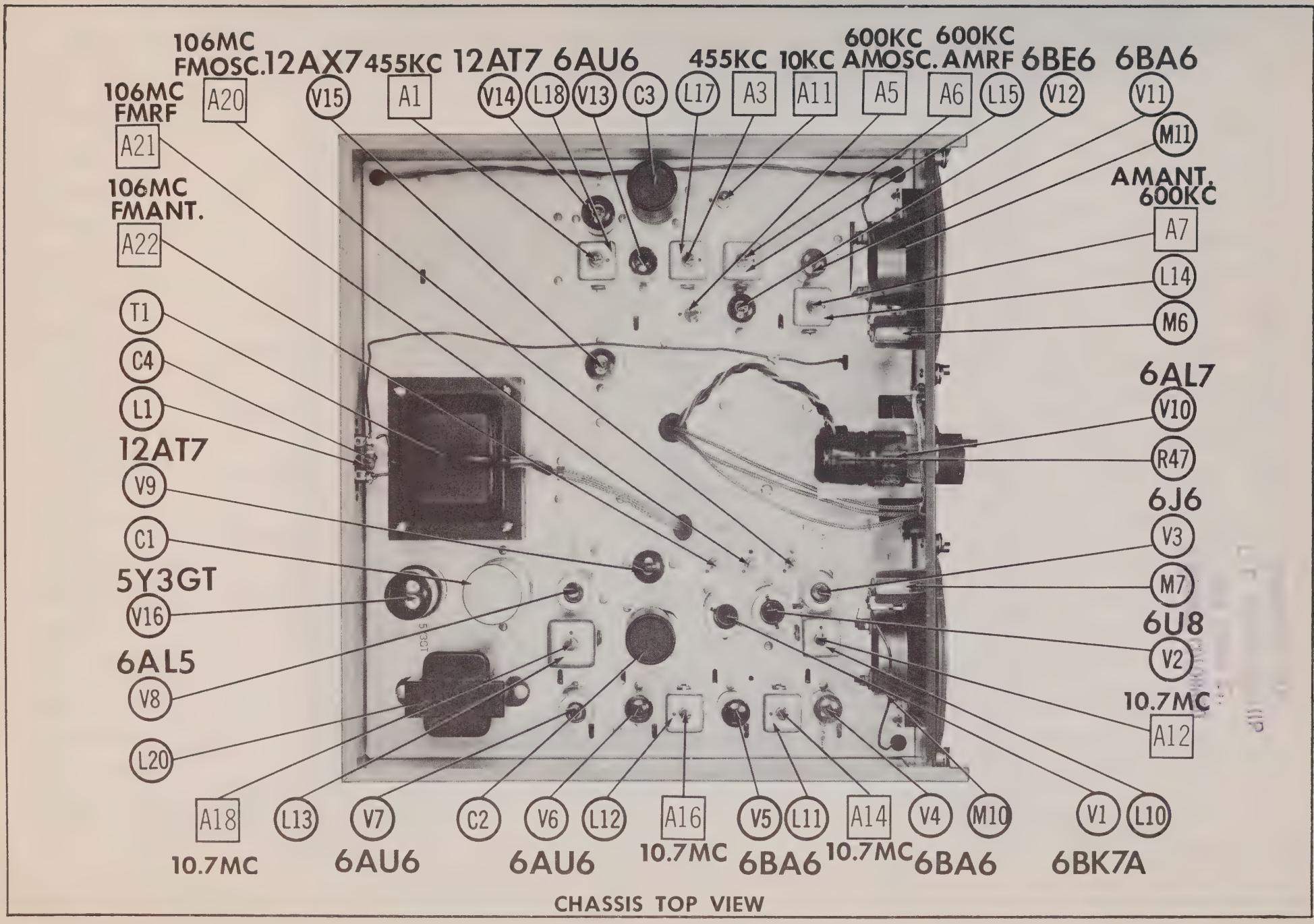
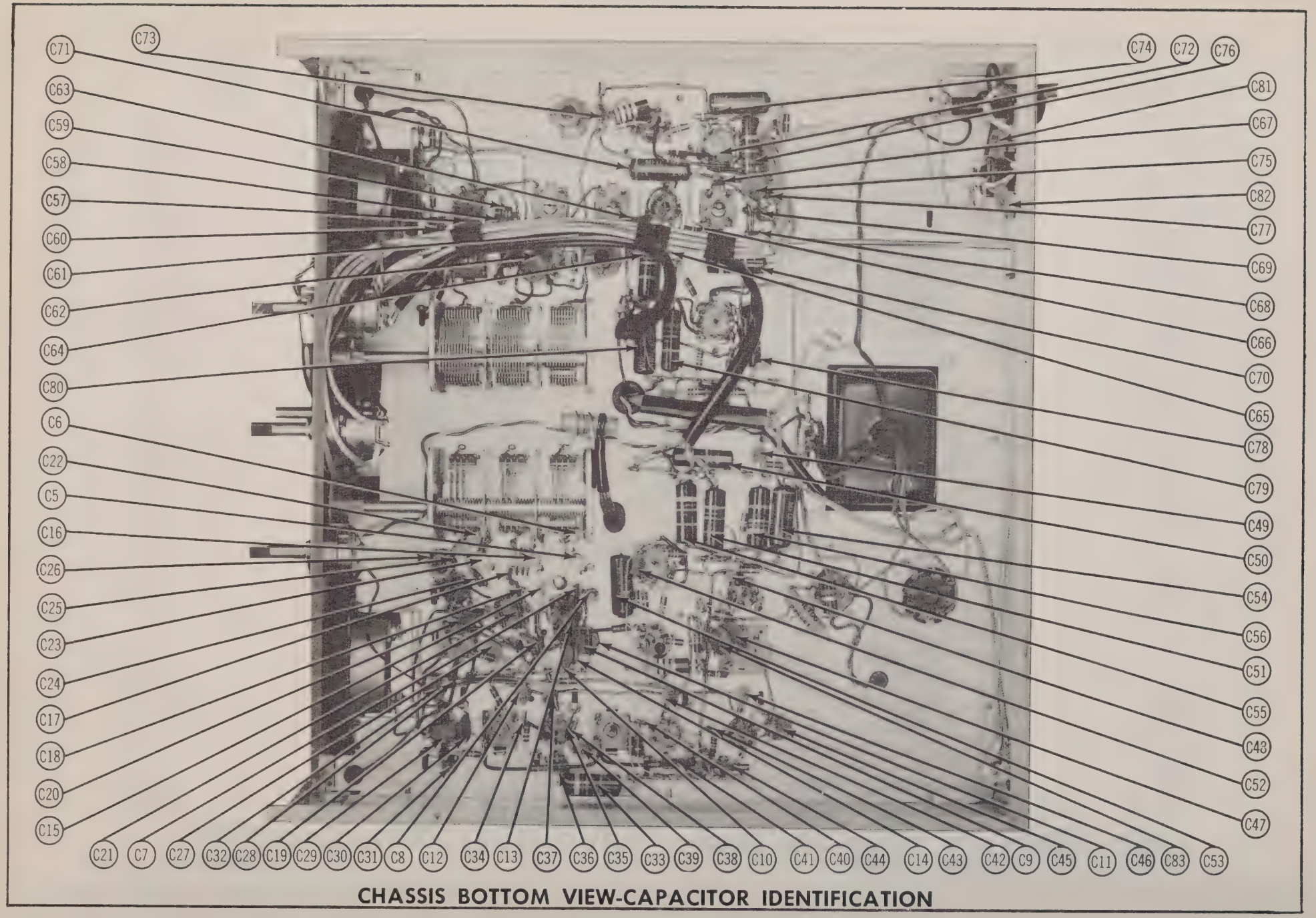


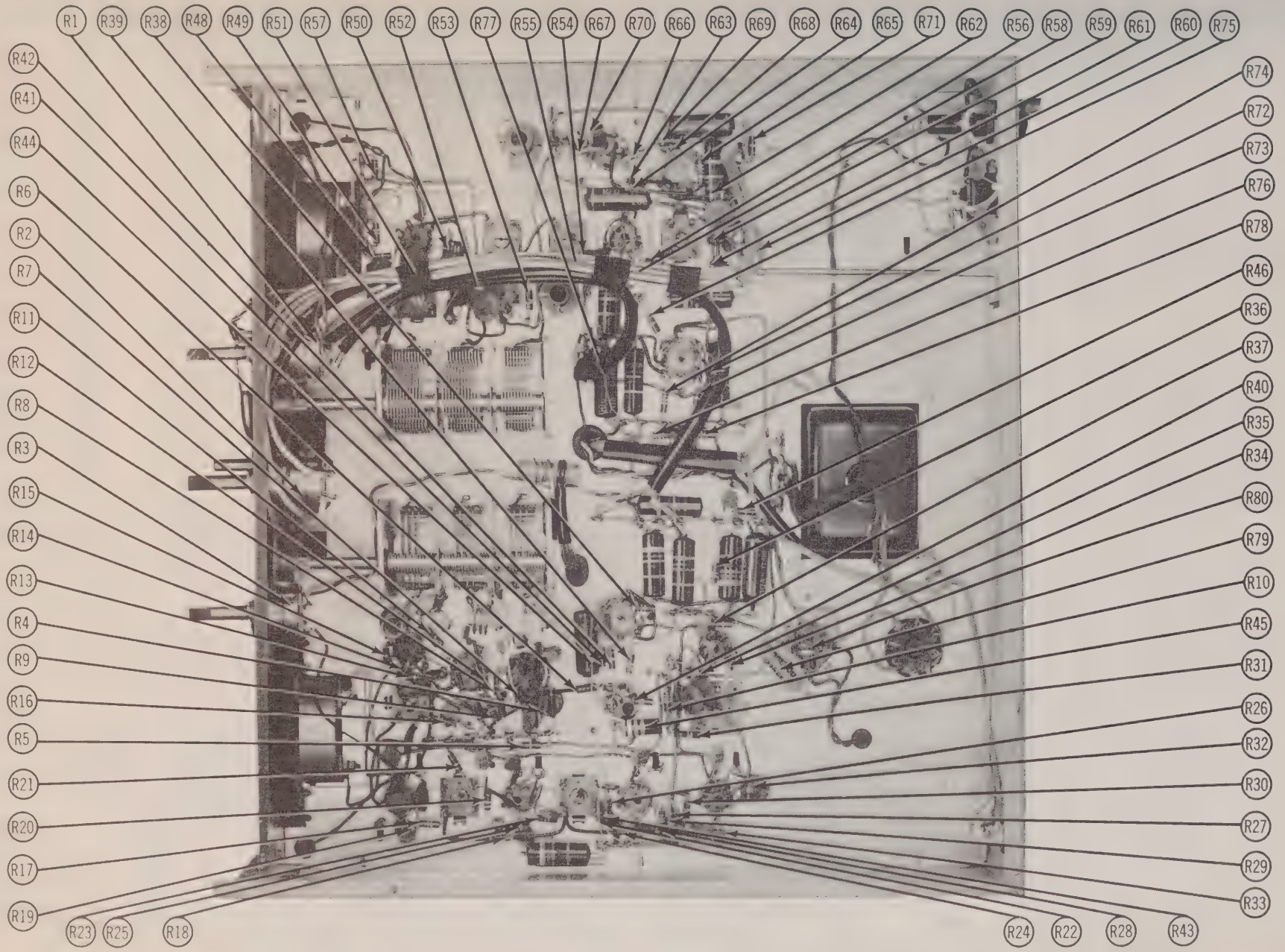
FIG. 2




CHASSIS TOP VIEW




**CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION**




CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

# PARTS LIST AND DESCRIPTIONS

## TUBES ( GENERAL ELECTRIC, SYLVANIA)

| ITEM No. | USE | TYPE | NOTES |
|---|---|---|---|
| V1 | FM RF Amplifier | 6BK7A | |
| V2 | FM Mixer FM Osc. | 6U8 | |
| V3 | FM AFC | 6J6 | |
| V4 | 1st. FM IF Amplifier | 6BA6 | |
| V5 | 2nd. FM IF Amplifier | 6BA6 | |
| V6 | 1st. Limiter | 6AU6 | |
| V7 | 2nd. Limiter | 6AU6 | |
| V8 | Discriminator | 6AL5 | |

| ITEM No. | USE | TYPE | NOTES |
|---|---|---|---|
| V9 | FM AF Amp.-FM Squelch | 12AT7 | |
| V10 | Tuning Indicator | 6AL7 | |
| V11 | AM RF Amplifier | 6BA6 | |
| V12 | AM Converter | 6BE6 | |
| V13 | AM IF Amplifier | 6AU6 | |
| V14 | AM AF Amp.-AM Squelch | 12AT7 | |
| V15 | Tuning Indicator Amp. | 12AX7 | |
| V16 | Rectifier | 5Y3GT | |

## ELECTROLYTIC CAPACITORS

| ITEM No. | RATING CAP. | RATING VOLT. | REPLACEMENT DATA Electro-Voice PART No. | AEROVOX PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | PYRAMID PART No. | SANGAMO PART No. | SPRAGUE PART No. |
|---|---|---|---|---|---|---|---|---|---|
| C1A | 20 | 350 | 4299 | | D0032 | FP376.9 | | Q-012 | R2287* |
| B | ● 40 | 350 | | | BR4035 | TC-60 | | MT-4520 | |
| C | ■ 40 | 350 | | | | | | | |
| D | ▲ 40 | 350 | | | | | | | |
| C2A | ■ 20 | 350 | 42010 | AFH2-37 | B0300 | FP227 | TMD-35 | D-160 | TVL-2755 |
| B | ▲ 20 | 350 | | | | | | | |
| C3A | ▲ 20 | 350 | 42010 | AFH2-37 | B0300 | FP227 | TMD-35 | D-160 | TVL-2755 |
| B | ■ 20 | 350 | | | | | | | |

* Non Catalog Item

## FIXED CAPACITORS

**Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.**

| ITEM No. | RATING CAP. | RATING VOLT | REPLACEMENT DATA Electro-Voice PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | ERIE PART No. | MALLORY PART No. | SPRAGUE PART No. | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| C4 | 10 | | | SI 10 | D6-100 | LT6Q1 | GP-10 | UC-541 | 5GA-Q1 | ① |
| C5 | .5-5 | | 42009 | | | | 532-A | | | |
| C6 | 3 | | | | | C10V3C | TCO-3 | ZT-553 | | ② |
| C7 | 50 | | 42005 | BPD-00005 | DD-500 | L10Q5 | ED-50 | UC-545 | 5GA-Q5 | |
| C8 | 1000 | | 4258 | BPD-001 | DD-102 | BYA6D1 | ED-1000 | DC521 | 5HK-D1 | |
| C9 | 2000 | | 4259 | BPD-002 | DD-202 | BYA10D2 | ED-002 | DC522 | 5HK-D2 | |
| C10 | 10000 | | 4252 | BPD-01 | DD-103 | BYA6S1 | ED-01 | DC511 | 5HK-S1 | |
| C11 | 10000 | | 4252 | BPD-01 | DD-103 | BYA6S1 | ED-01 | DC511 | 5HK-S1 | |
| C12 | 2000 | | 4259 | BPD-002 | DD-202 | BYA10D2 | ED-002 | DC522 | 5HK-D2 | ① |
| C13 | 50 | | 42005 | BPD-00005 | DD-500 | L10Q5 | ED-50 | UC-545 | 5GA-Q5 | |
| C14 | 2000 | | 4259 | BPD-002 | DD-202 | BYA10D2 | ED-002 | DC522 | 5HK-D2 | |
| C15 | 50 | | 42005 | BPD-00005 | DD-500 | L10Q5 | ED-50 | UC-545 | 5GA-Q5 | |
| C16 | .5-5 | | 42009 | | | | 532-A | | | |
| C17 | 50 | | 42005 | BPD-00005 | DD-500 | L10Q5 | ED-50 | UC-545 | 5GA-Q5 | |
| C18 | 1.0 | | 42006 | NPO-SI1.0 | TCZ-1 | | TCO-1 | | 5TCCB-V1 | |
| C19 | 10000 | | 4252 | BPD-01 | DD-103 | BYA6S1 | ED-01 | DC511 | 5HK-S1 | |
| C20 | 10000 | | 4252 | BPD-01 | DD-103 | BYA6S1 | ED-01 | DC511 | 5HK-S1 | |
| C21 | 10000 | | 4252 | BPD-01 | DD-103 | BYA6S1 | ED-01 | DC511 | 5HK-S1 | |
| C22 | 5 | | 42007 | SI5 | D6-050 | LT6V5 | ED-5 | ZT-555 | 5GA-V5 | |
| C23 | .5-5 | | 42009 | | | | 532-A | | | |
| C24 | 50 | | 42005 | BPD-00005 | DD-500 | L10Q5 | ED-50 | UC-545 | 5GA-Q5 | |
| C25 | 10 | | 4212 | SI10 | D6-100 | LT6Q1 | GP-10 | UC-541 | 5GA-Q1 | |
| C26 | 10000 | | 4252 | BPD-01 | DD-103 | BYA6S1 | ED-01 | DC511 | 5HK-S1 | |
| C27 | 2000 | | 4259 | BPD-002 | DD-202 | BYA10D2 | ED-002 | DC522 | 5HK-D2 | |
| C28 | 10000 | | 4252 | BPD-01 | DD-103 | BYA6S1 | ED-01 | DC511 | 5HK-S1 | |
| C29 | 2000 | | 4259 | BPD-002 | DD-202 | BYA10D2 | ED-002 | DC522 | 5HK-D2 | |
| C30 | 10000 | | 4252 | BPD-01 | DD-103 | BYA6S1 | ED-01 | DC511 | 5HK-S1 | ③ |
| C31 | 2000 | | 4259 | BPD-002 | DD-202 | BYA10D2 | ED-002 | DC522 | 5HK-D2 | |
| C32 | 2000 | | 4259 | BPD-002 | DD-202 | BYA10D2 | ED-002 | DC522 | 5HK-D2 | |
| C33 | .047 | 400 | 4243 | P488N-047 | DF-503 | CUB4S47 | | GEM-4147 | 4TM-S47 | |
| C34 | 2000 | | 4259 | BPD-002 | DD-202 | BYA10D2 | ED-002 | DC522 | 5HK-D2 | |
| C35 | 2000 | | 4259 | BPD-002 | DD-202 | BYA10D2 | ED-002 | DC522 | 5HK-D2 | |
| C36 | 2000 | | 4259 | BPD-002 | DD-202 | BYA10D2 | ED-002 | DC522 | 5HK-D2 | |
| C37 | 2000 | | 4259 | BPD-002 | DD-202 | BYA10D2 | ED-002 | DC522 | 5HK-D2 | |
| C38 | 1000 | | 4258 | BPD-001 | DD-102 | BYA6D1 | ED-1000 | DC521 | 5HK-D1 | ① |
| C39 | 2000 | | 4259 | BPD-002 | DD-202 | BYA10D2 | ED-002 | DC522 | 5HK-D2 | ① |
| C40 | 50 | | 42005 | BPD-00005 | DD-500 | L10Q5 | ED-50 | UC-545 | 5GA-Q5 | |
| C41 | 10000 | | 4252 | BPD-01 | DD-103 | BYA6S1 | ED-01 | DC511 | 5HK-S1 | |
| C42 | 2000 | | 4259 | BPD-002 | DD-202 | BYA10D2 | ED-002 | DC522 | 5HK-D2 | |

# PARTS LIST AND DESCRIPTIONS (Continued)

## RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

| ITEM No. | RATING OHMS | RATING WATT | Electro-Voice PART No. | NOTES |
|---|---|---|---|---|
| R4 | 120K | | 4670 | Note 1 |
| R5 | 1000Ω | | 4693 | |
| R6 | 56Ω | | 4622 | |
| R7 | 820Ω | | 4694 | Note 2 |
| R8 | 1.2Meg | | 4656 | |
| R9 | 820Ω | | 4694 | |
| R10 | 270Ω | | 46034 | Note 3 |
| R11 | 12K | | 4649 | |
| R12 | 8200Ω | | 46031 | Note 4 |
| R13 | 47Ω | | 46035 | |
| R14 | 18K | | 46029 | |
| R15 | 470Ω | | 4654 | |
| R16 | 120K | | 4670 | |
| R17 | 18K | | 46029 | |
| R18 | 270Ω | | 46034 | |
| R19 | 68Ω | | 4631 | |
| R20 | 2.7Meg | | 46030 | |
| R21 | 2.7Meg | | 46030 | |
| R22 | 1.2Meg | | 4656 | |
| R23 | 18K | | 46029 | |
| R24 | 270Ω | | 46034 | |
| R25 | 68Ω | | 4631 | |
| R26 | 120K | | 4670 | |
| R27 | 12K | | 4649 | |
| R28 | 27K | | 4651 | |
| R29 | 47K | | 4668 | |
| R30 | 27K | | 4651 | |
| R31 | 12K | | 4649 | |
| R32 | 27K | | 4651 | |
| R33 | 27K | | 4651 | |
| R34 | 120K | | 4670 | |
| R35 | 120K | | 4670 | |
| R36 | 150K | | 4603 | |
| R37 | 1.2Meg | | 4656 | |
| R38 | 470K | | 4650 | |
| R39 | 12K | | 4649 | |
| R40 | 12K | | 4649 | |
| R41 | 8200Ω | | 46031 | |
| R42 | 1800Ω | | 4677 | |

| ITEM No. | RATING OHMS | RATING WATT | Electro-Voice PART No. | NOTES |
|---|---|---|---|---|
| R43 | 1.2Meg | | 4656 | |
| R44 | 470K | | 4650 | |
| R45 | 39K | 2 | 4682 | |
| R46 | 1.2Meg | | 4656 | |
| R47 | 3300Ω | | 46017 | |
| R48 | 47K | | 4668 | |
| R49 | 120K | | 4670 | |
| R50 | 18K | | 46029 | |
| R51 | 68Ω | | 4631 | |
| R52 | 8200Ω | | 46031 | |
| R53 | 22K | | 4678 | |
| R54 | 3.3Meg | | 46033 | |
| R55 | 4.7Meg | | 46026 | |
| R56 | 18K | | 46029 | |
| R57 | 4700Ω | | 4675 | |
| R58 | 68Ω | | 4631 | |
| R59 | 270K | | 4669 | |
| R60 | 270K | | 4669 | Note 5 |
| R61 | 2.7Meg | | 46030 | |
| R62 | 4.7Meg | | 46026 | |
| R63 | 2.7Meg | | 46030 | |
| R64 | 470K | | 4650 | |
| R65 | 470K | | 4650 | |
| R66 | 12K | | 4649 | |
| R67 | 12K | | 4649 | |
| R68 | 8200Ω | | 46031 | |
| R69 | 1800Ω | | 4677 | |
| R70 | 39K | 2 | 4682 | |
| R71 | 1.2Meg | | 4656 | |
| R72 | 180K | | 4671 | |
| R73 | 2700Ω | | 46036 | |
| R74 | 180K | | 4671 | |
| R75 | 2700Ω | | 46036 | |
| R76 | 470K | | 4650 | |
| R77 | 12Meg | | 4672 | |
| R78 | 470K | | 4650 | |
| R79 | 100Ω | 4 | 4684 | |
| R80 | 100Ω | 2 | 4655 | |

Note 1. Some versions may use 1.2Meg in this application (Part#4656)
Note 2. Some versions may use 270Ω in this application (Part#46034)
Note 3. Not used in some versions.
Note 4. Some versions may use 4700Ω in this application (Part#4675)
Note 5. Some versions may use 82K in this application (Part#4696)

## TRANSFORMER (POWER)

| ITEM No. | RATING PRI. | RATING SEC. 1 | RATING SEC. 2 | RATING SEC. 3 | REPLACEMENT DATA Electro-Voice PART No. | Halldorson PART No. | Merit PART No. | Stancor PART No. | Thordarson PART No. | Triad PART No. |
|---|---|---|---|---|---|---|---|---|---|---|
| T1 | 117VAC @.83A | 460VCT @.140A | 5V @2A | 6.3V @4.8A | 1598 | | | | | |

# PARTS LIST AND DESCRIPTIONS (Continued)

## CAPACITORS (cont)

| ITEM No. | RATING CAP. | RATING VOLT | REPLACEMENT DATA Electro-Voice PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | ERIE PART No. | MALLORY PART No. | SPRAGUE PART No. | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| C43 | 20 | | 42004 | BPD-00002 | DD-200 | L10Q2 | ED-20 | UC-542 | 5GA-Q2 | |
| C44 | 10000 | | 4252 | BPD-01 | DD-103 | BYA6S1 | ED-01 | DC511 | 5HK-S1 | |
| C45 | 10000 | | 4252 | BPD-01 | DD-103 | BYA6S1 | ED-01 | DC511 | 5HK-S1 | |
| C46 | 2000 | | 4259 | BPD-002 | DD-202 | BYA10D2 | ED-002 | DC522 | 5HK-D2 | |
| C47 | 10000 | | 4252 | BPD-01 | DD-103 | BYA6S1 | ED-01 | DC511 | 5HK-S1 | |
| C48 | 50 | | 42005 | BPD-00005 | DD-500 | LT6Q5 | GP-50 | UC-545 | 5GA-Q5 | |
| C49 | 500 | | 42003 | BPD-0005 | DD-501 | L10T5 | ED-500 | UC-535 | 5GA-T5 | |
| C50 | .022 | 400 | 4260 | P488N-022 | DD-203 | CUB4S22 | ED-02 | GEM-4122 | 4TM-S22 | |
| C51 | .047 | 400 | 4243 | P488N-047 | DF-503 | CUB4S47 | | GEM-4147 | 4TM-S47 | |
| C52 | 2000 | | 4259 | BPD-002 | DD-202 | BYA10D2 | ED-002 | DC522 | 5HK-D2 | |
| C53 | .1 | 200 | 4265 | P288N-1 | DF-104 | CUB2P1 | | GEM-201 | 2TM-P1 | |
| C54 | .1 | 200 | 4265 | P288N-1 | DF-104 | CUB2P1 | | GEM-201 | 2TM-P1 | |
| C55 | .047 | 400 | 4243 | P488N-047 | DF-503 | CUB4S47 | | GEM-4147 | 4TM-S47 | |
| C56 | .047 | 400 | 4243 | P488N-047 | DF-503 | CUB4S47 | | GEM-4147 | 4TM-S47 | |
| C57 | 2000 | | 4259 | BPD-002 | DD-202 | BYA10D2 | ED-002 | DC522 | 5HK-D2 | |
| C58 | 10000 | | 4252 | BPD-01 | DD-103 | BYA6S1 | ED-01 | DC511 | 5HK-S1 | |
| C59 | .022 | 200 | 4260 | P288N-022 | DD-203 | CUB4S22 | ED-02 | GEM-4122 | 2TM-S22 | |
| C60 | .047 | 400 | 4243 | P488N-047 | DF-503 | CUB4S47 | | GEM-4147 | 4TM-S47 | |
| C61 | 1000 | | 4258 | BPD-001 | DD-102 | BYA6D1 | ED-1000 | DC521 | 5HK-D1 | |
| C62 | 10000 | | 4252 | BPD-01 | DD-103 | BYA6S1 | ED-01 | DC511 | 5HK-S1 | |
| C63 | 10000 | | 4252 | BPD-01 | DD-103 | BYA6S1 | ED-01 | DC511 | 5HK-S1 | |
| C64 | .047 | 400 | 4243 | P488N-047 | DF-503 | CUB4S47 | | GEM-4147 | 4TM-S47 | |
| C65 | 10000 | | 4252 | BPD-01 | DD-103 | BYA6S1 | ED-01 | DC511 | 5HK-S1 | |
| C66 | 10000 | | 4252 | BPD-01 | DD-103 | BYA6S1 | ED-01 | DC511 | 5HK-S1 | |
| C67 | 6.2 | | | | | | | | | ① NPO |
| C68 | 100 | | 4181 | BPD-0001 | DD-101 | L10T1 | ED-100 | UC-531 | 5GA-T1 | |
| C69 | 100 | | 4281 | BPD-0001 | DD-101 | L10T1 | ED-100 | UC-531 | 5GA-T1 | |
| C70 | .047 | 400 | 4243 | P488N-047 | DF-503 | CUB4S47 | | GEM-4147 | 4TM-S47 | |
| C71 | .1 | 200 | 4265 | P288N-1 | DF-104 | CUB2P1 | | GEM-201 | 2TM-P1 | |
| C72 | 2000 | | 4259 | BPD-002 | DD-202 | BYA10D2 | ED-002 | DC522 | 5HK-D2 | |
| C73 | 500 | | 42003 | BPD-0005 | DD-501 | L10T5 | ED-500 | UC-535 | 5GA-T5 | |
| C74 | .1 | 200 | 4265 | P288N-1 | DF-104 | CUB2P1 | | GEM-201 | 2TM-P1 | |
| C75 | 10000 | | 4252 | BPD-01 | DD-103 | BYA6S1 | ED-01 | DC511 | 5HK-S1 | |
| C76 | .022 | 400 | 4260 | P488N-022 | DD-203 | CUB4S22 | ED-02 | GEM-4122 | 4TM-S22 | |
| C77 | .022 | 400 | 4260 | P488N-022 | DD-203 | CUB4S22 | ED-02 | GEM-4122 | 4TM-S22 | |
| C78 | .022 | 400 | 4260 | P488N-022 | DD-203 | CUB4S22 | ED-02 | BEM-4122 | 4TM-S22 | |
| C79 | .022 | 400 | 4260 | P488N-022 | DD-203 | CUB4S22 | ED-02 | GEM-4122 | 4TM-S22 | |
| C80 | .1 | 200 | 4265 | P288N-1 | DF-104 | CUB2P1 | | GEM-201 | 2TM-P1 | |
| C81 | 10000 | | 4252 | BPD-01 | DD-103 | BYA6S1 | ED-01 | DC511 | 5HK-S1 | ④ |
| C82 | 10000 | | 4252 | BPD-01 | DD-103 | BYA6S1 | ED-01 | DC511 | 5HK-S1 | ④ |
| C83 | 10000 | | 4252 | BPD-01 | DD-103 | BYA6S1 | ED-01 | DC511 | 5HK-S1 | ① |

① Not used in some versions
② Some versions may use 7.5 MFD in this application (Part#42008)
③ Some version may use 2000 MFD in this application (Part # 4259)
④ Some version may use .047 MFD in this application (Part # 4243)

## CONTROLS

| ITEM No. | RATING RESISTANCE | RATING WATTS | REPLACEMENT DATA Electro-Voice PART No. | CENTRALAB PART No. | CLAROSTAT PART No. | IRC PART No. | MALLORY PART No. | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|
| R1A | 5Meg | ½ | U4686 | B-87 | A47-5Meg-S | Q11-141 | U-67 | AFC |
| B | Shaft | | | Not Reg. | FS-3 | Not Reg. | Not Reg. | |
| C | Switch | | | KB-1 | SWE-12 | 76-1 | US-26 | Squelch |
| R2A | 500K | ½ | Y4686 | | | Q11-133 | UE1404S | Balance |
| B | 500K | ½ | | | | M11-133 | Not Reg. | Balance |
| C | Switch | | | | | 76-2 | Not Reg. | AM Output |
| R3A | 500K | ½ | X4686 | | AD47-500K-Z | | UE1403S | Level |
| B | 500K | ½ | | | FS-3 | | Not Reg. | Level |
| C | Shaft | | | | FS-3 | | Not Reg. | |
| D | Switch | | | | SWE-12 | | Not Reg. | Power On-Off |

# PARTS LIST AND DESCRIPTIONS (Continued)

## COILS (RF-IF)

| ITEM No. | USE | REPLACEMENT DATA Electro-Voice PART No. | MEISSNER PART No. | MERIT PART No. | MILLER PART No. | NOTES |
|---|---|---|---|---|---|---|
| L1 | FM Ant. Trans. | | | | | |
| L2 | Fm Coupling Coil | | | | | |
| L3 | FM Ant. Coil | | | | | |
| L4 | RF Choke | | 19-1001 | BC-562 | 4604 | 1.7 Microhenries |
| L5 | RF Choke | | 19-1001 | BC-562 | 4604 | 1.7 Microhenries |
| L6 | RF Choke | | 19-1001 | BC-562 | 4604 | 1.7 Microhenries |
| L7 | FM RF Coil | 3590 | | | | |
| L8 | Fil. Choke | | 19-1001 | BC-562 | 4604 | 1.7 Microhenries |
| L9 | FM Osc. Coil | 3589 | | | | |
| L10 | 1st FM IF | 15008 | 16-3471▲ | FM-254▲* | 1463▲* | |
| L11 | 2nd FM IF | 15004 | 16-3471▲ | FM-254▲* | 1463▲* | |
| L12 | 3rd FM IF | 15004 | 16-3471▲ | FM-254▲* | 1463▲* | |
| L13 | FM Discriminator | 15002 | | FM-250▬ | 1452▬ | Includes 18K Resistor |
| L14 | AM Ant. Trans. | 15006 | | | | |
| L15 | AM RF Trans. | 15007 | | | | |
| L16 | AM Osc. Coil | 15009 | | | 70-Osc♦ | |
| L17 | 1st AM IF | 15003 | | | | |
| L18 | 2nd AM IF | 15005 | | | | |
| L19 | 10KC Filter | 15010 | | | | |

▲ Drill 2 Mounting Holes
* Use Adapter Plate
♦ Disregard Primary. Drill New Mounting Hole
▬ Parallel With 18K Resistor

## FILTER CHOKE

| ITEM No. | RATINGS TOTAL DIRECT CURRENT | RATINGS D. C. RESISTANCE | RATINGS INDUCTANCE (0 CURRENT 1000 ~) | REPLACEMENT DATA Electro-Voice PART No. | Halldorson PART No. | Merit PART No. | Stancor PART No. | Thordarson PART No. | Triad PART No. |
|---|---|---|---|---|---|---|---|---|---|
| L20 | .130A | 85Ω | 3HY | 1599 | C5026 | C-2974 | C-2303 | | C-13X ① |

① Drill New Mounting Hole

## FUSES

| ITEM No. | TYPE | RATING | REPLACEMENT DATA Electro-Voice PART No. FUSE | Electro-Voice PART No. HOLDER | LITTELFUSE PART No. FUSE | LITTELFUSE PART No. HOLDER | BUSS PART No. FUSE | BUSS PART No. HOLDER |
|---|---|---|---|---|---|---|---|---|
| M1 | 3AG | 1½A 125V (Slo-Blo) | 20171 | | 31301.5 (3AG 1½A 125V Slo-Blo) | 342001 | MDL 1½ | HKP |

## CRYSTAL DIODES

| ITEM No. | ORIG. TYPE | REPLACEMENT DATA Electro-Voice PART No. | CBS PART No. | SYLVANIA PART No. | NOTES |
|---|---|---|---|---|---|
| M2 | IN294 | 4346 | IN54A | IN34A | AM Detector |
| M3 | IN294 | 4346 | IN54A | IN34A | Tuning Indicator Rectifier |
| M4 | IN294 | 4346 | IN54A | IN34A | Tuning Indicator Rectifier |

## MISCELLANEOUS

| ITEM No. | PART NAME | Electro-Voice PART No. | NOTES |
|---|---|---|---|
| M5 | Pilot Lamp | | #1847 |
| M6 | Dial Lamp | | FM, #47 |
| M7 | Dial Lamp | | AM, #47 |
| M8 | AM Tuning Cap. | 42012 | 3 Gang (Ant. 15-400MMF, RF 15-400MMF, Osc. 35-200MMF) |
| M9 | FM Tuning Cap. | 42011 | 3 Gang |
| M10 | Meter | | AM Signal Strength. |
| M11 | Meter | | FM Signal Strength. |

PHOTOFACT* Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

TELECTRO
MODEL 1960

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MODEL 1960

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DENVER, COLORADO

TELECTRO
MODEL 1960

## GENERAL INFORMATION

The "Telectro" Model 1960 is designed to record and play back two tracks of material on standard width recording tape, which doubles the playing time of a 3" or 5" reel with no loss of frequency response or quality. Recordings can be made from a radio, television receiver or phonograph, in addition to those made directly from the microphone. A high speed wind and rewind control is located in the center of the upper plate.

The "Telectro" Model 1960 has two tape speeds, 3 3/4" and 7 1/2" per second. Using both tracks of the tape, the recording time is as follows:

| REEL SIZE | 3 3/4" SPEED | 7 1/2" SPEED |
|---|---|---|
| 3" (300 Ft.) | 1/2 Hour | 1/4 Hour |
| 5" (600 Ft.) | 1 Hour | 1/2 Hour |

Connect this recorder to an outlet supplying 110-120 volts, 60 cycles AC only. Before connecting to your line supply, be absolutely certain that it agrees with the above specificiations.

MANUFACTURED BY:

TELECTROSONIC CORPORATION
35-18 37th STREET
LONG ISLAND CITY, N. Y.

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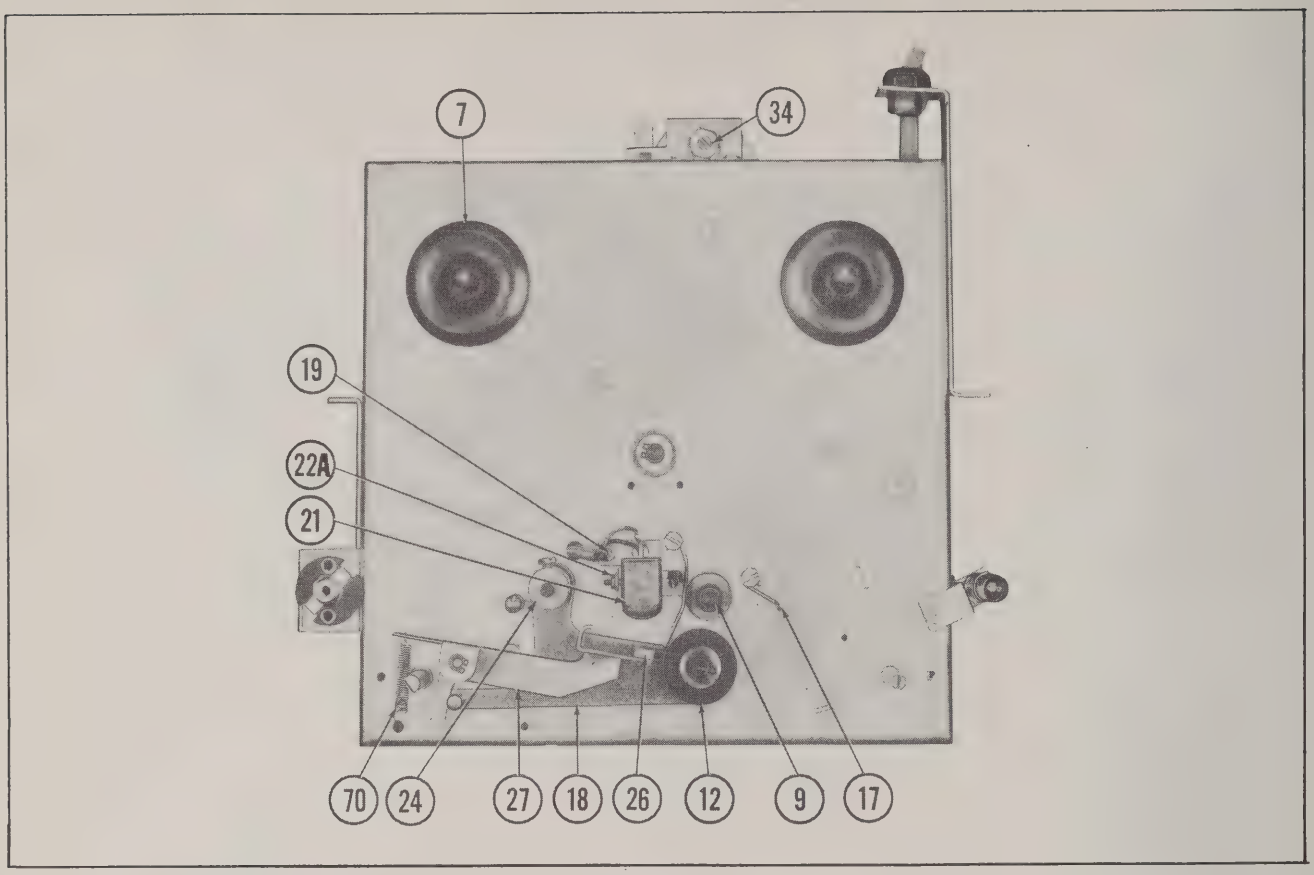


FIGURE 1

## SPECIFICATIONS

Size-Portable Unit

7 1/2" x 11" x 11 5/8"

Weight

Approximately 16 lbs.

Case

Airplane cloth luggage carrying case, two-tone

Tape Speed

3 3/4" per second and 7 1/2" per second

Tracks

Dual track

Reel Size

5" maximum

Tape Wind

Type "A"

Track Selection

Manual turnover

Head Alignment Provision

Yes

Record Volume Indicator

Neon type

Tube Complement

12AX7 - Pre-Amplifier, 12AU7 - AF Amplifier, 50C5 - Audio Output-Bias Oscillator, 35W4 - Rectifier.

## OPERATING CONTROLS

Power On-Off And Volume Control

Turning this control turns the power On or Off; controls the sound level for recording and volume when playing back.

Function Control

"Idle" is the neutral or stationary tape position. To "Play", turn the knob clockwise for the play operation. This position puts the tape in motion for playback of recordings. To "Record"; first with your right hand, push the Record Button down. Hold this button in the down position, as you turn the Function Control knob counter-clockwise into the "Record" position with your left hand. Remove your hand from the Record Button as it as now in the locked position.

NOTE: When the recorder is not in use make sure the Function Control is in the "Idle" position.

Wind-Rewind Control

Turn this control to the right for Fast Wind (to skip head). For Fast Rewind, turn this control to the left.

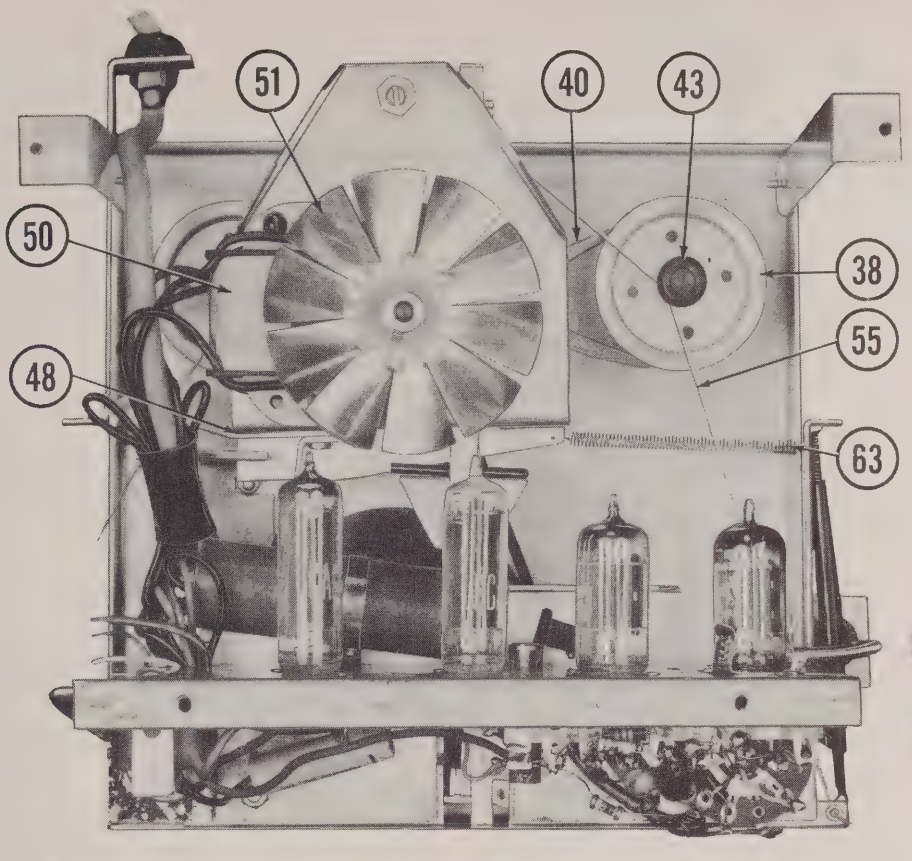


FIGURE 2

CAUTION: Before operating the Wind-Rewind control, be sure to place the Function control in the Idle position.

Speed Change Push Button Control

To operate at fast speed (7 1/2"), push the button all the way down. To operate at slow speed (3 3/4"), pull the button all the way up. The fast speed, 7 1/2 ips, is recommended for recording music where higher frequency response is desired. The slow speed, 3 3/4 ips, is recommended where full frequency response is not essential; recording speech would be an example of the use of this speed.

CAUTION: Do not change speeds when Function control is in "Record" or "Play" position. Your Speed Change Push Button control is designed so that it will stop spinning as soon as you grip it. Grip Speed Change Button only when Function control is in "Idle".

## OPERATING INSTRUCTIONS

Threading The Tape

With the Function control in "Idle" position, place an empty reel on the right hand (take-up) spindle. Place a full reel of tape on the left hand (supply) spindle so that the tape will lead off in a counter-clockwise direction. Remove approximately twelve inches of tape from the supply reel for ease of threading the machine. Hold a section of tape straight with both hands and insert the tape into the tape slot. Insert the free end of the tape into one of the hub slots on the take-up reel, then wind the reel one or two times counter-clockwise to secure the tape and to take up all slack.

NOTE: Extreme caution should be taken in the threading of the recorder to avoid putting a twist in the tape. Also make certain the smooth (or shiny) side of the tape is facing the front of the recorder.

To Record

Plug the line cord into a convenient wall receptacle and insert the microphone plug into the "Input Jack" located on top of the recorder. Turn power on by turning "On-Off-Volu me" control clockwise until a click is heard, and allow approximately one minute for warm up. Thread tape as described under "Threading The Tape". Turn Function control to "Record" position. Adjust "Volume" control until "Recording Level Indicator" flashes on high peaks only. To record from radio, phonograph, or television, follow same procedure as above, keeping volume of recorder at a normal level. To stop movement of tape, turn Function control to "Idle" position.

To Wind Or Rewind Tape

Turn power on Turn Function control to "Idle" position. To rewind or wind tape hold Wind-Rewind control knob to the left or right. Holding Wind-Rewind control knob to the right will cause the recorder to "Wind" tape. Holding Wind-Rewind control knob to the left will cause the recorder to "Rewind" tape. Releasing this control will automatically stop movement of tape.

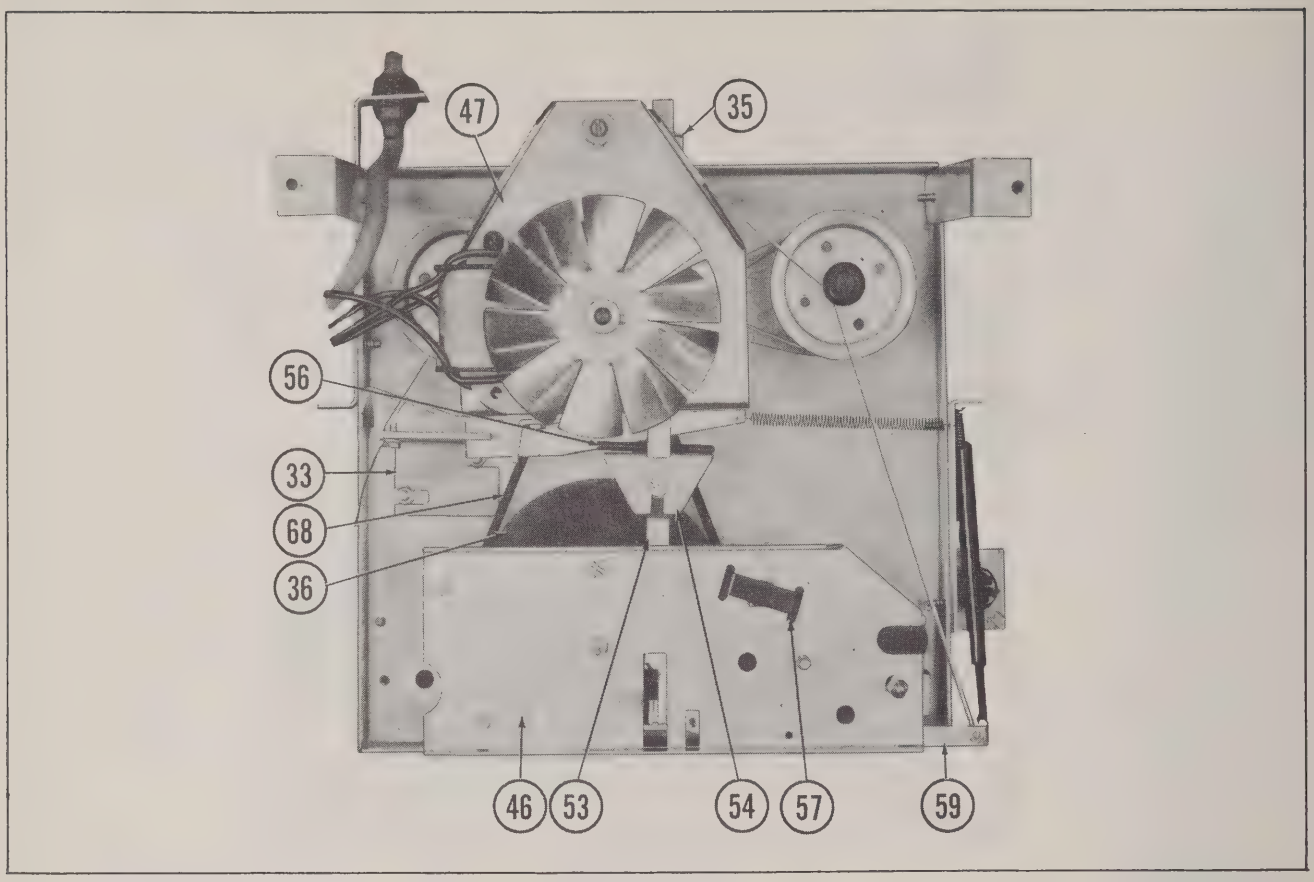


FIGURE 3

To Play A Recording

Turn power on. Allow approximately one minute for warm up. Turn Function control to "Play" position. Adjust "Volume" control for desired listening level. To stop movement of tape, turn Function control to "Idle" position.

CAUTION: Do not set Function control to "Record" position when "Play" is desired. In "Record" position previously recorded portion of tape is automatically erased.

Erasing Recorded Material

When the Function control is in the "Record" position, the erase head is automatically positioned, erasing any previous recording before a new one is made. You may erase material no longer needed, without recording, by turning Function control to the "Record" position and turning the "Volume" control knob to the minimum volume position or extreme counter-clockwise position just before the recorder shuts off. One track is erased at a time. To erase the second track, reverse the reels and repeat the above operation.

To Edit And Splice Tape

NOTE: Since it is impossible to edit and splice one track without affecting the other, recordings which are to be edited should be limited to one track only.

1. The tape may be edited by cutting out unwanted portions, or by joining selections into another sequence. Announcements may be inserted between selections etc. Unused sections of tape can be spliced together for re-use.

2. Cut tape at a 60° angle with an overlap so ends will line up. (Cutting tape at 60° angle will eliminate detection of splice on recording.)

3. Align both ends of tape, glossy side up. Cover aligned ends with splicing tape, evenly and securely, and trim off any excessive width.

Dual Track Recording

The "Telectro" is designed so that only half the tape width is recording at a time; thereby resulting in two track recording. This two track operation is accomplished in the following manner:

1. After a reel of tape has been recorded, i.e. all the tape wound onto the right reel, turn Function control to "Idle" position.

2. Remove the reels from the recorder, turning the full reel over and placing it on the left spindle.

3. Properly thread the tape and proceed with the recording.

4. After the second track has been recorded the frist track of recording is ready to be played, without rewinding, by reversing the reels as described in step 2 above.

## ADJUSTMENTS

### Play-Record Head Adjustment

It is very important that Play-Record Head (21) be lined up perfectly with the tape. If it is not, low output, loss of high frequencies or track overlap may result.

CAUTION: The head was adjusted and sealed in place at time of manufactured and further adjustment should not be necessary unless the head becomes faulty and replacement is required. There are two adjustments to be made, they are as follows:

1. One is the head height. This should be adjusted so that the top edge of the tape lines up evenly with the top edge of the record head lamination. Adjustment can be made by loosening nuts (22) and slightly raising or lowering play record head (21).

2. To adjust the head for the maximum frequency response, adjustment (19) should be either screwed in or out. This moves the head from side to side slightly until the maximum high frequencies are obtained. After adjusting the head for maximum frequency response check head height again.

### Erase Head Adjustment

Erase Head (24) should be adjusted so that the erase magnet effects only the top half of the recorded tape. This adjustments should be made in the "Record" position only and is made by loosening screw (23), located in the erase head. Erase head (24) is then moved up or down till only the top half of the tape is effected. When properly adjusted only the top half of the tape will be erased at a time.

### Brake Release Bracket Adjustment

Brake release bracket (54) can be adjusted by loosening screw (54A) and moving the bracket forward or backward. When bracket (54) is moved to the rear of the recorder; wind-rewind lever assembly (56) contacts brake release bracket (54), causing brake lacing cord (55) to have a greater amount of slack. To obtain less slack in brake lacing cord (55) reverse the above adjustment.

### Spindle (7) End Play Adjustment

The Spindles should have from 1/32" to 1/16" of up and down movement. Loosen the set screw (41) in the pulleys (38) and move the pulleys up or down until the correct amount of end play is obtained.

## TROUBLES

### Fails To Erase

1. Set screw (23) in erase head (24) loose causing head to remain in "Play" or "Idle" position. For adjustment see "Erase Head Adjustment".

2. Interlock shaft assembly (57) fails to go down for enough to let interlock slide (62) to slide to one side. Function knob (3A) will not go in to the "Record" position when this occurs.

### No Drive On Record Or Playback

1. Rubber drive belt (68) loose or broken.
2. Take-up belt (39) loose or broken.
3. Defective Motor (50).
4. Connecting leads fouling motor fan (51).
5. Flywheel and capstan shaft binding.

### Speed Variation Or "Wow"

1. Check capstan sleve assembly (9), pressure roller (12), and motor pulley (44), for oil or foreign material. Clean with soft cloth and carbon tetrachloride.

2. Check Adjustment of brake cord (55).

### No Wind Or Rewind

1. Drive belt (68) loose or broken.
2. Belt (39) or (40) loose or broken.
3. Check for oil or grease on driving surfaces. Clean with soft cloth and carbon tetrachloride.

## LUBRICATION

All moving parts of this recorder are located in self lubricated oilite bearings, therefore, in normal use, no lubrication is necessary. When unit is disassembled for repair, clean all bearing with a clean soft cloth and apply a thin film of oil on bearings surface.

## CLEANING

The capstan roller (12), capstan shaft and play-record head (21) are subject to a coating of tape oxide which is worn off the tape as it passed these parts. This condition will cause poor performance and should be removed occasionally with a soft cloth and carbon tetrachloride.

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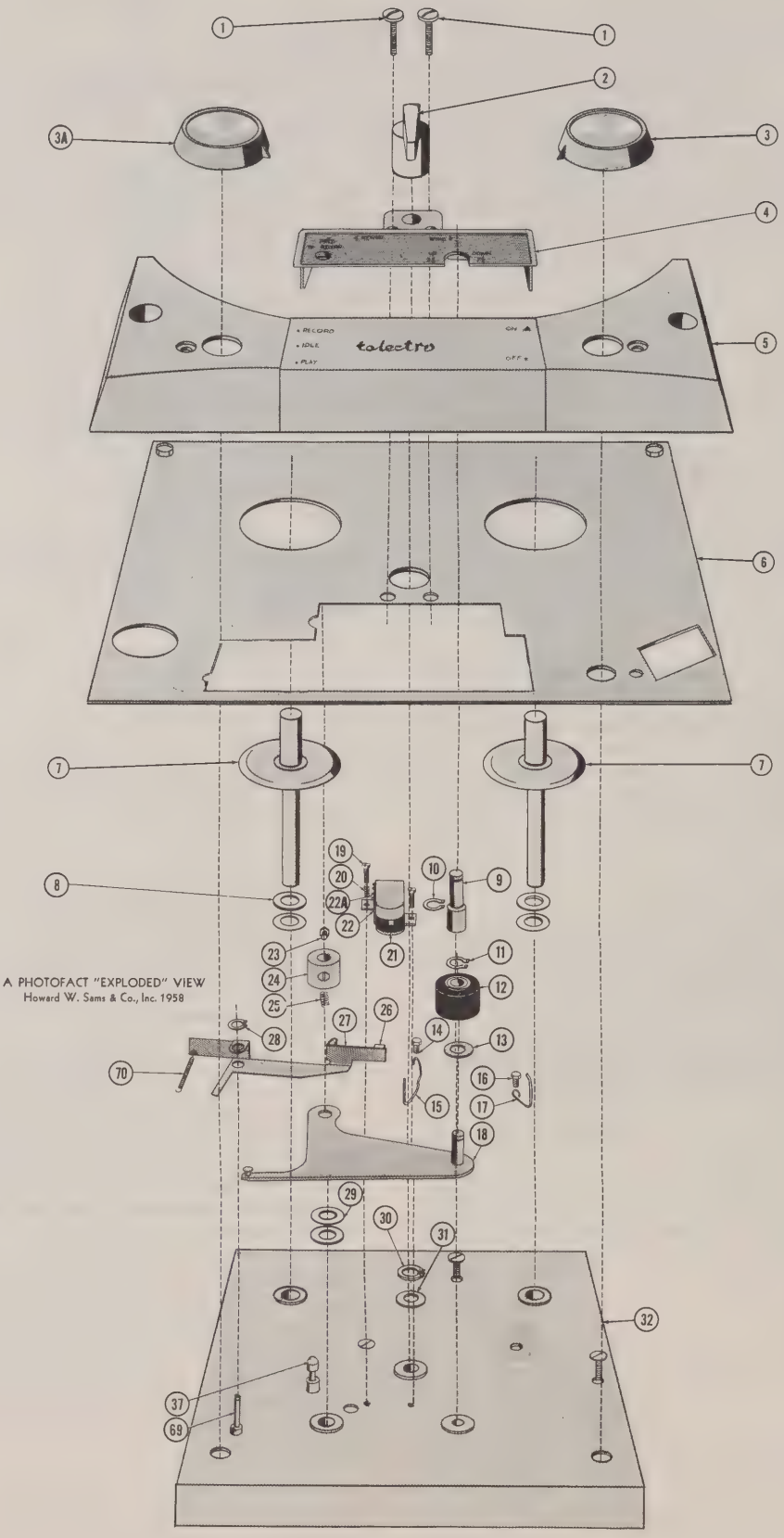
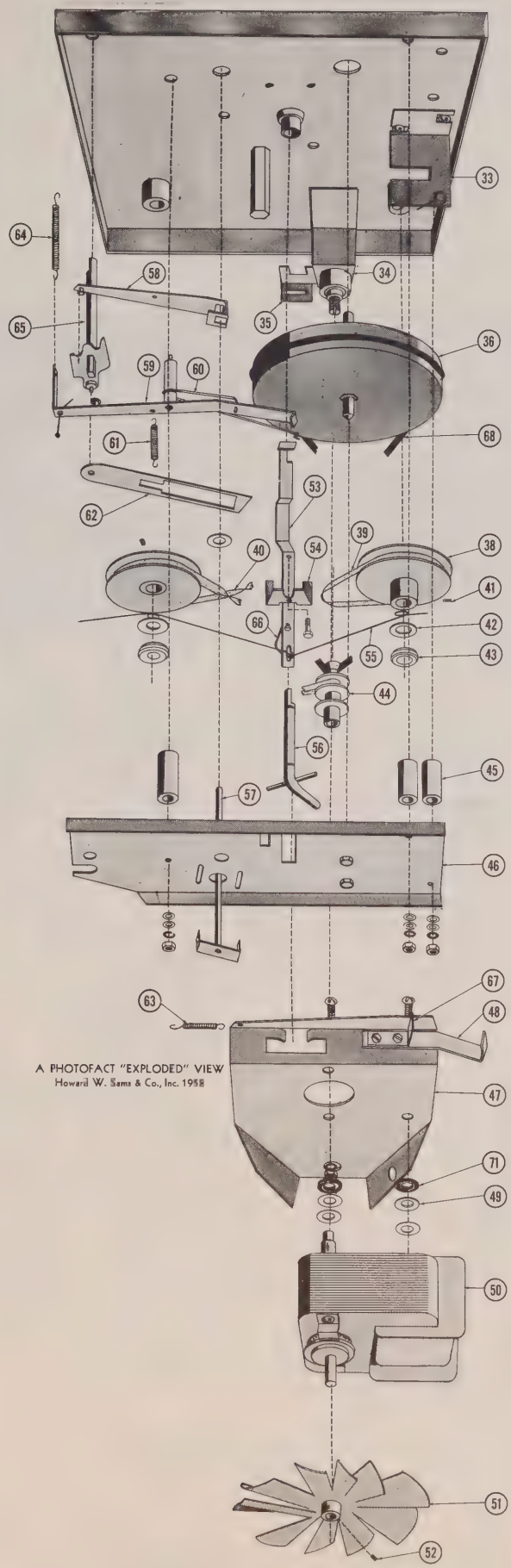
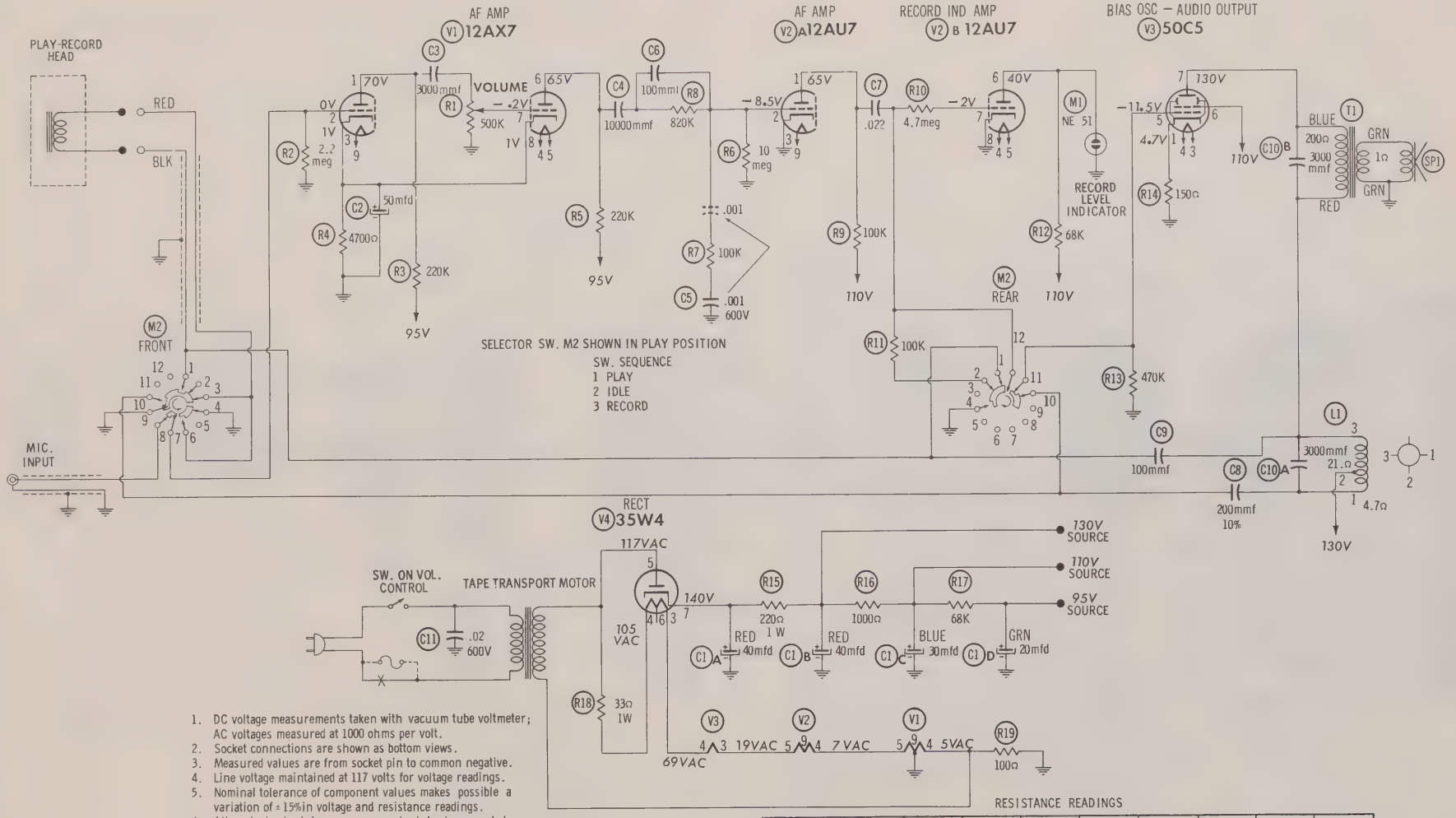



FIGURE 4A EXPLODED VIEW OF PARTS ABOVE BASEPLATE




A PHOTOFACT "EXPLODED" VIEW
Howard W. Sams & Co., Inc. 1958

FIGURE 4B EXPLODED VIEW OF PARTS BELOW BASEPLATE




1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

RESISTANCE READINGS

| ITEM | TUBE | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 | Pin 8 | Pin 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| V1 | 12AX7 | †290K | 2.2Meg | 4700Ω | 6Ω | 6Ω | †290K | 500K | 4700Ω | 0Ω |
| V2 | 12AU7 | †100K | 10Meg | 0Ω | 6Ω | 16Ω | †69K | 4.7Meg | 0Ω | 0Ω |
| V3* | 50C5 | 150Ω | 470K | 16Ω | 46Ω | 470K | †1220Ω | †440Ω | | |
| V4 | 35W4 | TP | TP | 46Ω | 55Ω | 55Ω | NC | 20K(Min) | | |

ALL MEASUREMENTS TAKEN IN RECORD POSITION
† MEASURED FROM 140 V. SOURCE
TP TIE POINT
NC NO CONNECTION

A PHOTOFACT STANDARD NOTATION SCHEMATIC
Howard W. Sams & Co., Inc. 1958

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# PARTS LIST AND DESCRIPTIONS

## TUBES ( GENERAL ELECTRIC, SYLVANIA )

| ITEM No. | USE | TYPE | NOTES |
|---|---|---|---|
| V1 | AF -Amp | 12AX7 | |
| V2 | AF -Amp | 12AU7 | |

| ITEM No. | USE | TYPE | NOTES |
|---|---|---|---|
| V3 | Output-Bias Osc | 50C5 | |
| V4 | Rectifier | 35W4 | |

## ELECTROLYTIC CAPACITORS

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | CAP. | VOLT. | TELECTRO PART No. | AEROVOX PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | PYRAMID PART No. | SANGAMO PART No. | SPRAGUE PART No. |
| C1A | 40 | 150 | TC-1192 | PR4-200 | BBRT44215 | WQ295 | | Q-005 | R2591 * |
| B | 40 | 150 | | | | TC42 | | | |
| C | 30 | 150 | | | | | | | |
| D | 20 | 150 | | | | | | | |
| C2 | 50 | 3 | TC-1550 | XPP-3050 | BBR50-3 | TT6X50 | TD-50-6 | MMT-350 | TVA-1100 |

* Non-Catalog Item

## FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| | CAP. | VOLT | TELECTRO PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | ERIE PART No. | MALLORY PART No. | SPRAGUE PART No. | |
| C3 | 3000 | | TC-1551 | BPD-003 | DD-302 | BYA10D3 | ED-003 | UC-523 | 5GA-D3 | |
| C4 | 10000 | | TC-1552 | BPD-01 | DD-103 | BYA6S1 | ED-01 | DC511 | 5HK-S1 | |
| C5 | .001 | 600 | TC-1553 | P688N-001 | D6-102 | CUB6D1 | GP-1000 | GEM-621 | 6TM-D1 | |
| C6 | 100 | | TC-1554 | SI 100 | D6-101 | LT6T1 | GP-100 | UC-531 | 5GA-T1 | |
| C7 | .022 | 200 | TC-1555 | P288N-022 | D6-203 | CUB4S22 | ED-02 | GEM-4122 | 2TM-S22 | |
| C8 | 200 | | TC-1557 | | D6-201 | L10T2 | ED-201 | | MS-32 | |
| C9 | 100 | | TC-1554 | SI 100 | D6-101 | LT6T1 | GP-100 | UC-531 | 5GA-T1 | |
| C10A | 3000 | | TC-1476 | BPD-2X003 | DD-302 | BYC6DD3 | ED2-003 | UC-523 | 5GA-D3 | |
| B | 3000 | | | | DD-302 | | | UC-523 | 5GA-D3 | |
| C11 | .02 | 600 | TC-1269 | P688N-02 | D6-203 | CUB6S2 | ED-02 | GEM-612 | 6TM-S2 | |

## CONTROLS

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|
| | RESISTANCE | WATTS | TELECTRO PART No. | CENTRALAB PART No. | CLAROSTAT PART No. | IRC PART No. | MALLORY PART No. | |
| R1A | 500K | ½ | TP-871 | AB-60 | A47-500K-Z | Q13-137 | TA55A | Volume |
| B | Shaft | | | AK-11 | KSS-5 | C3 † | DS-36 ‡ | |
| C | Switch | | | KB-1 or KR-1 * | SWE-12 | 76-1 | US-26 | |

* Use KR-1 on Red Label Control only.
† Shaft Coupler
‡ Extension Shaft

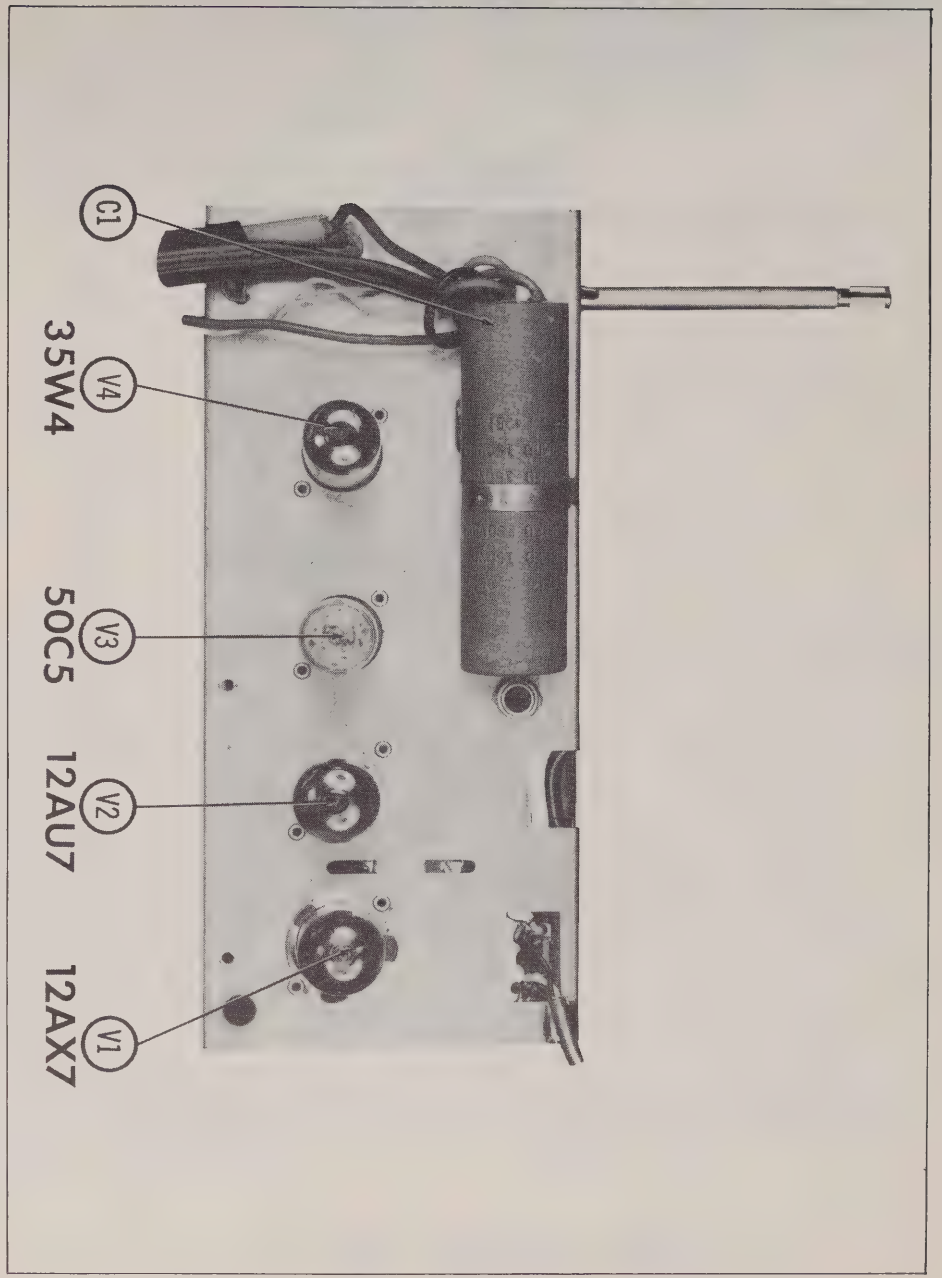
## RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

| ITEM No. | RATING | | TELECTRO PART No. | NOTES |
|---|---|---|---|---|
| | OHMS | WATT | | |
| R2 | 2.2Meg | | TR-1424 | |
| R3 | 220K | | TR-691 | |
| R4 | 4700Ω | | TR-088 | |
| R5 | 220K | | TR-691 | |
| R6 | 10Meg | | TR-1427 | |
| R7 | 100K | | TR-1426 | |
| R8 | 820K | | TR-1425 | |
| R9 | 100K | | TR-689 | |
| R10 | 4.7Meg | | TR-1428 | |

| ITEM No. | RATING | | TELECTRO PART No. | NOTES |
|---|---|---|---|---|
| | OHMS | WATT | | |
| R11 | 100K | | TR-689 | |
| R12 | 68K | | TR-273 | |
| R13 | 470K | | TR-268 | |
| R14 | 150Ω | | TR-1469 | |
| R15 | 220Ω | 1 | TR-276 | |
| R16 | 1000Ω | | TR-282 | |
| R17 | 68K | | TR-273 | |
| R18 | 33Ω | 1 | TR-694 | |
| R19 | 100Ω | | TR-1430 | |

## CHASSIS—TOP VIEW



# PARTS LIST AND DESCRIPTIONS (Continued)

## TRANSFORMER (AUDIO OUTPUT)

| ITEM No. | IMPEDANCE | | REPLACEMENT DATA | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | PRI. | SEC. | TELECTRO PART No. | Halldorson PART No. | Merit PART No. | Stancor PART No. | Thordarson PART No. | Triad PART No. | |
| T1 | 2400Ω | 3-4Ω | TT-663 | Z1101 | A-3025 | A-3332 | 24S53 | S-12X | |

## SPEAKER

| ITEM No. | TYPE | | | REPLACEMENT DATA | | NOTES |
|---|---|---|---|---|---|---|
| | SIZE | FIELD | V. C. IMP. | TELECTRO PART No. | QUAM PART No. | |
| SP1 | 4" X 6" | PM | 3-4Ω | TS-1671 | 46A07 | |

## COILS

| ITEM No. | USE | REPLACEMENT DATA | | | | NOTES |
|---|---|---|---|---|---|---|
| | | TELECTRO PART No. | MEISSNER PART No. | MERIT PART No. | MILLER PART No. | |
| L1 | Bias Osc. | | | | | |

## MISCELLANEOUS

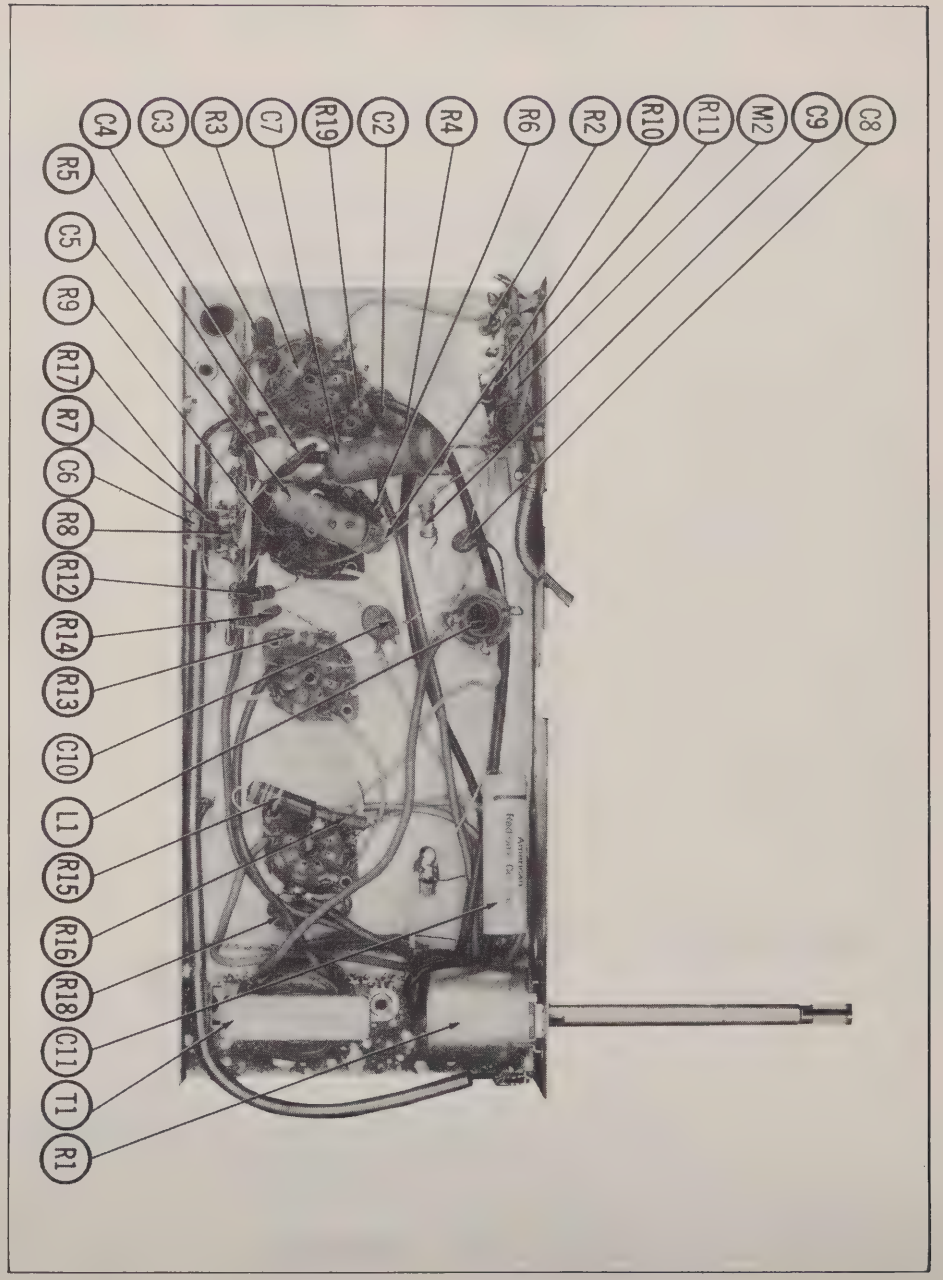
| ITEM No. | PART NAME | TELECTRO PART No. | NOTES |
|---|---|---|---|
| M1 | Indicator Lamp | | NE51 |
| M2 | Switch | | Selector |

## CABINETS & CABINET PARTS

**(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)**

| NAME | PART NO. | DESCRIPTION |
|---|---|---|
| Knob | TK-191 | On-Off-Volume (Sets With Split Knurled Shaft) Gray |
| Knob | TK-227 | On-Off-Volume (Set With 1/4 Diameter Shaft With Flat) Gray |
| Knob | TK-192 | Wind & Rewind, Gray |

## CHASSIS—BOTTOM VIEW



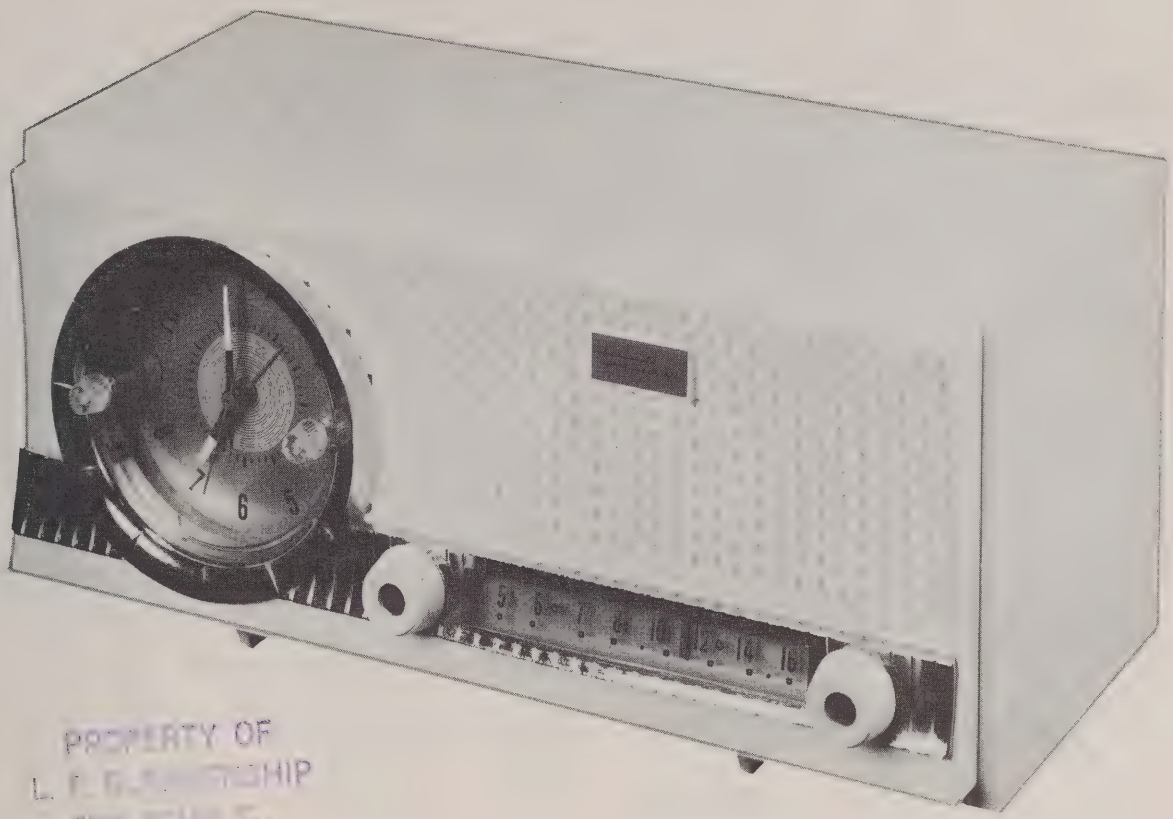
# MECHANICAL PARTS LIST

| Ref. No. | Part No. | DESCRIPTION | Ref. No. | Part No. | DESCRIPTION |
|---|---|---|---|---|---|
| 1 | | Rear Escutcheon Mounting Screws | 34 | TB-635 | Bearing Motor Pivot |
| 2 | TK-192 | Wind-Rewind Knob | 35 | TB-859 | Brake Rod Guide Bracket |
| 3 | TK-191 | Volume Control Knob | 36 | TF-309 | Flywheel Assembly |
| 3A | TK-227 | Function Control Knob | 37 | TT-657 | Tape Guide, Left |
| 4 | TA-1032 | Rear Escutcheon Assembly (Gray) | 38 | TA-265 | Reel Pulley Assembly |
| | TE-261 | Rear Escutcheon (Without Dress Plate) | 39 | TB-660 | Cloth Take-Up Belt |
| | TP-887 | Dress Plate, Rear Escutcheon | 40 | TB-661 | Cloth Rewind Belt |
| 5 | TA-1031 | Front Escutcheon Assembly (Gray) | 41 | | Set Screw |
| | TE-262 | Front Escutcheon (Without Dress Plate) | 42 | | Washer |
| | TP-886 | Dress Plate, Front Escutcheon | 43 | TG-220 | Grommet 1/4 I.D. Black |
| 6 | TP-858 | Dress Plate, Motor Board | 44 | TA-797 | Motor Pulley Assembly |
| 7 | TA-676 | Spindles | 45 | TS-1630 | Spacer, Motor Board Sub-Plate |
| 8 | | Washers | 46 | TP-849 | Motor Board Sub-Plate |
| 9 | TA-1037 | Capstan Sleeve Assembly (With Ring) | 47 | TB-878 | Motor Mounting Bracket |
| 10 | | Retaining Ring | 48 | TH-515 | Excursion Limt Hook |
| 11 | | Retaining Ring | 49 | | Washers |
| 12 | TA-1002 | Capstan Roller Assembly | 50 | TM-352 | Motor (Alliance) |
| 13 | | Capstan Roller Washer | 51 | TF-258 | Fan |
| 14 | | Screw | 52 | | Fan Set Screw |
| 15 | TG-414 | Tape Guide, Upright | 53 | TR-1413 | Brake Release Rod |
| 16 | | Screw | 54 | TB-858 | Brake Release Bracket |
| 17 | TG-435 | Tape Guide, Right | 55 | TB-634 | Band, Brake Lacing Cord, Nylon 24" Long |
| 18 | TA-1014 | Capstan Roller Plate Assembly | | | |
| 19 | | Head Adjustment Screws | 56 | TA-1015 | Wind-Rewind Lever Assembly |
| 20 | TS-1755 | Spring, Record Head | 57 | TA-1031 | Interlock Shaft Assembly |
| 21 | TH-494 | Recording Head | 58 | TC-1495 | Capstan Roller Plate Cam Lever |
| | | Clips | 59 | TA-1004 | Switch Detent Lever Assembly |
| 22 | TB-901 | Record Head Mounting Bracket | 60 | TS-1682 | Switch Detent Lever Spring |
| 22A | | Record Head Mounting Nuts | 61 | TS-1681 | Capstan Roller Plate Lever Spring |
| 23 | | Erase Magnet Adjustment Screw | 62 | TS-1625 | Interlock Slide |
| 24 | TA-1006 | Erase Magnet Assembly | 63 | | Spring |
| 25 | TS-1659 | Spring, Erase Magnet Return | 64 | TS-1682 | Spring, Switch Detent Lever |
| 26 | TB-863 | Record Head Pressure Pad | 65 | TA-1003 | Switch cam Assembly |
| 27 | TA-1030 | Pressure Pad Bracket Assembly | 66 | TS-1657 | Brake Rod Return Spring |
| 28 | | Retaining Ring | 67 | TB-879 | Rewind Stop Bracket |
| 29 | | Washer | 68 | TO-171 | Linear O-Ring Drive Belt |
| 30 | | Retaining Ring | 69 | TP-876 | Record-Head Pad Braket Pivot |
| 31 | | Washer | 70 | TS-1680 | Pressure Pad Spring |
| 32 | TB-863 | Motor Board | 71 | TM-274 | Motor Shock Mounts |
| 33 | TB-619 | Bracket Excursion Limt | | | |

PHOTOFACT* Folder
*TRADE MARK

# TRUETONE MODELS D2801A, D2802, D2802A

TRUETONE MODELS
D2801A, D2802, D2802A



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DENVER, COLORADO

TRUETONE MODELS
D2801A, D2802, D2802A

| | |
|---|---|
| TRADE NAME | Truetone Models D2801A, D2802, D2802A |
| SUPPLIER | Western Auto Supply Co., 2107 Grand Ave., Kansas City, Mo. |
| TYPE SET | AC Operated AM Receiver With Electric Clock |
| TUBES (Five) | Types 12BE6 Converter, 12BA6 IF Amplifier, 12AV6 Det.-AVC-AF Amp., 50C5 Output, 35W4 Rectifier |
| POWER SUPPLY | 110-120 Volts AC-60 Cycles |
| RATING | .27 Amp. @ 117 Volts AC (27 Watts Without Clock) |
| TUNING RANGE—BROADCAST | 535KC - 1620KC |

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | RADIO DIAL SETTING | OUTPUT METER | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|
| 1. | .1MFD | High side to pin 7 (grid) of 12BE6 (V1). Low side to B-. | 455KC (400~ Mod) | Tuning gang fully open | Across voice coil | A1, A2, A3, A4 | Adjust for maximum output. |
| 2. | | Loop | 1620KC | " | " | A5 | Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output. |
| 3. | | " | 1400KC | 1400KC | " | A6 | " |

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1958 Howard W. Sams & Co., Inc., Indianapolis 5, Indiana. Printed in U.S. of America

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FOLDER 9

# PARTS LIST AND DESCRIPTIONS

TRUETONE MODEL D2801A

## TUBES ( GENERAL ELECTRIC, SYLVANIA)

| ITEM No. | USE | TYPE | NOTES |
|---|---|---|---|
| V1 | Converter | 12BE6 | |
| V2 | IF Amplifier | 12BA6 | |
| V3 | Det. -AVC-AF Amp. | 12AV6 | |
| V4 | Output | 50C5 | |
| V5 | Rectifier | 35W4 | |

## ELECTROLYTIC CAPACITORS

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | CAP. | VOLT. | TRUETONE PART No. | AEROVOX PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | PYRAMID PART No. | SANGAMO PART No. | SPRAGUE PART No. |
| C1A | 70 | 150 | EC-68 | PRS150V8040 | BBRD8415 | TCD498 | TDLD-11 | MTD-303 | TVA-2462 |
| B | 40 | 150 | | | | | | | |

## FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| | CAP. | VOLT | TRUETONE PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | ERIE PART No. | MALLORY PART No. | SPRAGUE PART No. | |
| C2 | .05 | 400 | PC-5 | P488N-05 | DF-503 | CUB4S5 | | GEM-415 | 4TM-S5 | |
| C3 | .022 | 400 | PC-47 | P488N-022 | DD-203 | CUB4S22 | ED-02 | GEM-4122 | 4TM-S22 | |
| C4 | .05 | 400 | PC-5 | P488N-05 | DF-503 | CUB4S5 | | GEM-415 | 4TM-S5 | |
| C5 | .1 | 400 | PC-8 | P488N-1 | DF-104 | CUB4P1 | | GEM-401 | 4TM-P1 | |

## CONTROLS

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|
| | RESISTANCE | WATTS | TRUETONE PART No. | CENTRALAB PART No. | CLAROSTAT PART No. | IRC PART No. | MALLORY PART No. | |
| R1A | 500K | ½ | | B-60 | A47-500K-Z | Q13-133 | U48 | Volume (Note 1) |
| B | Shaft | | | Not Req. | KSS-3 | Not Req. | Not Req. | |

Note 1. 1 Meg Control may be used in some versions (Part #VC-101).

## RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

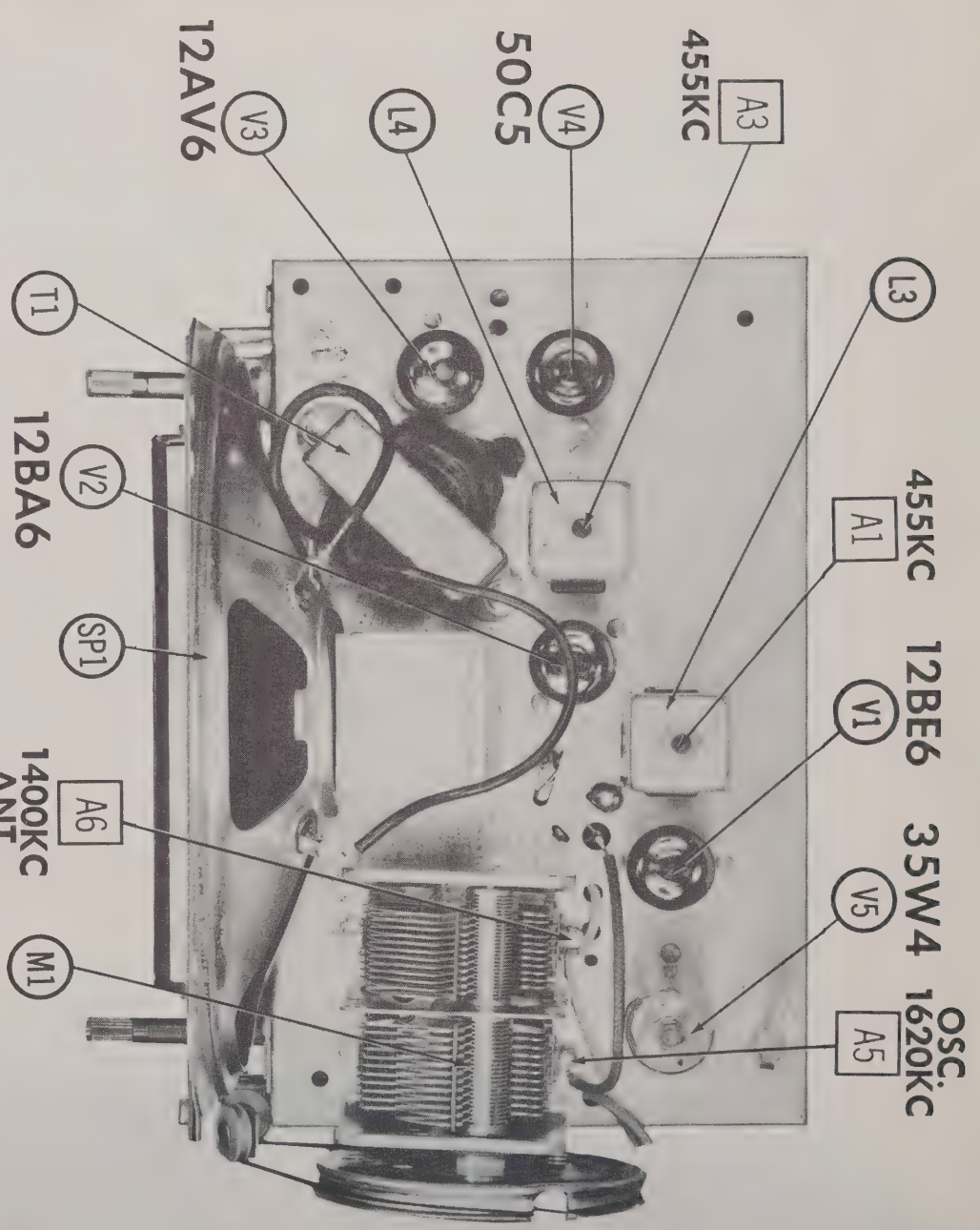
| ITEM No. | RATING | | TRUETONE PART No. | NOTES |
|---|---|---|---|---|
| | OHMS | WATT | | |
| R2 | 22K | | IR-45 | |
| R3 | 3.3Meg | | IR-23 | |
| R4 | 120Ω | | IR-155 | |

| ITEM No. | RATING | | TRUETONE PART No. | NOTES |
|---|---|---|---|---|
| | OHMS | WATT | | |
| R5 | 150Ω | | IR-98 | |
| R6 | 1000Ω | 1 | IR-42 | |

## TRANSFORMER (AUDIO OUTPUT)

| ITEM No. | IMPEDANCE | | REPLACEMENT DATA | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | PRI. | SEC. | TRUETONE PART No. | Halldorson PART No. | Merit PART No. | Stancor PART No. | Thordarson PART No. | Triad PART No. | |
| T1 | 2200Ω Tap@ 13Ω | 3-4Ω | AT-24 | Z1102 | A-3031 | A-3336 | 24S50A | S-16X | |

## CHASSIS—TOP VIEW



# PARTS LIST AND DESCRIPTIONS (Continued)

## SPEAKER

| ITEM No. | TYPE | | | REPLACEMENT DATA | | NOTES |
|---|---|---|---|---|---|---|
| | SIZE | FIELD | V. C. IMP. | TRUETONE PART No. | QUAM PART No. | |
| SP1 | 4" X 6" | P-M | 3-4Ω | SPK-55 | 46A15 | |

## COILS (RF-IF)

| ITEM No. | USE | REPLACEMENT DATA | | | | NOTES |
|---|---|---|---|---|---|---|
| | | TRUETONE PART No. | MEISSNER PART No. | MERIT PART No. | MILLER PART No. | |
| L1 | Loop Antenna | LL-48 | | | | Includes Cabinet Back |
| L2 | Osc. Coil | LO-27 | 14-1073 | BC-393 * | 69-OSC * | * Drill mounting hole |
| L3 | Input IF | LI-19 | 16-6758 | BC-352 | 12-C1 | |
| L4 | Output IF | LI-19 | 16-6758 | BC-353 | 12-C2 | |

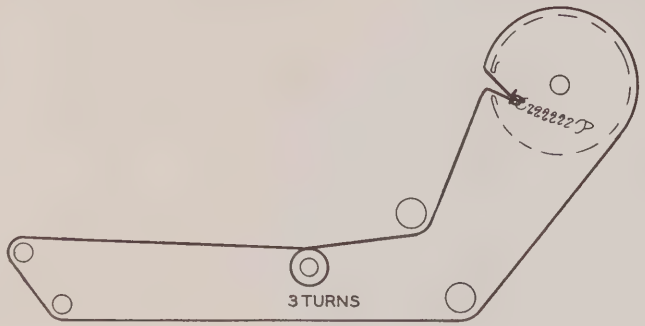
## COMPONENT COMBINATIONS

| ITEM No. | USE | DESCRIPTION | TRUETONE PART No. | REPLACEMENT DATA |
|---|---|---|---|---|
| K1 | Audio Coup. Net. | 2000MMF, 5000MMF, 220MMF, 250MMF, 6.8Meg, 470K, 470K | MC-19 | Aerovox PA-113-1<br>Centralab PC-150<br>Cornell-Dubilier 116TM1<br>Erie 1408-01<br>Sprague DT-4 |

## MISCELLANEOUS

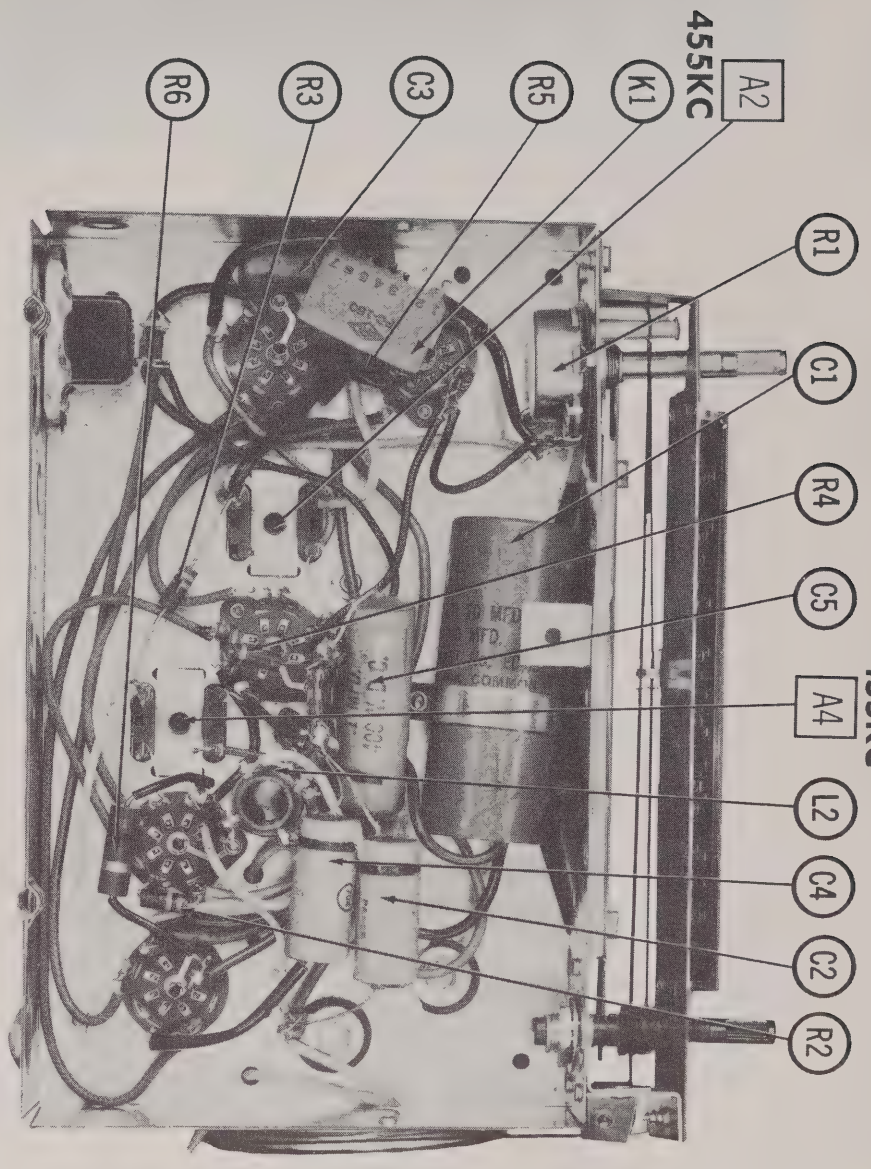
| ITEM No. | PART NAME | TRUETONE PART No. | NOTES |
|---|---|---|---|
| M1 | Tuning Cap | | 2 Gang (Ant. 34-398MMF, Osc. 30-176MMF) |
| | Tuning Cap | GC-24 | Alternate Models D2801A & D2802A |
| M2 | Clock | CK-7 | |

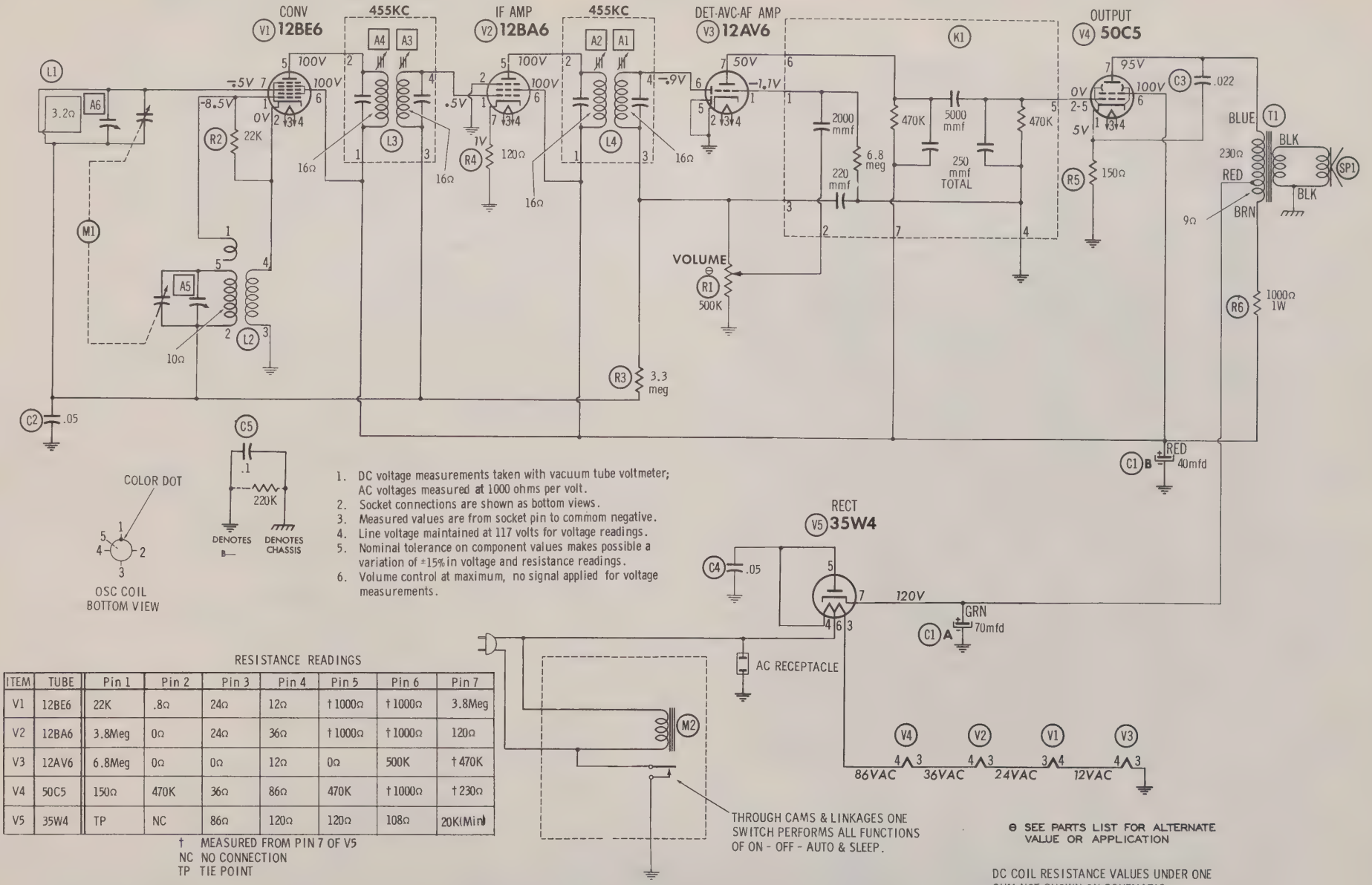
TUNING GANG FULLY CLOSED




## DIAL CORD STRINGING

## CHASSIS—BOTTOM VIEW






COLOR DOT

OSC COIL BOTTOM VIEW

DENOTES B— DENOTES CHASSIS

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to commom negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

RESISTANCE READINGS

| ITEM | TUBE | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 |
|---|---|---|---|---|---|---|---|---|
| V1 | 12BE6 | 22K | .8Ω | 24Ω | 12Ω | †1000Ω | †1000Ω | 3.8Meg |
| V2 | 12BA6 | 3.8Meg | 0Ω | 24Ω | 36Ω | †1000Ω | †1000Ω | 120Ω |
| V3 | 12AV6 | 6.8Meg | 0Ω | 0Ω | 12Ω | 0Ω | 500K | †470K |
| V4 | 50C5 | 150Ω | 470K | 36Ω | 86Ω | 470K | †1000Ω | †230Ω |
| V5 | 35W4 | TP | NC | 86Ω | 120Ω | 120Ω | 108Ω | 20K(Min) |

† MEASURED FROM PIN 7 OF V5
NC NO CONNECTION
TP TIE POINT

θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC

A PHOTOFACT STANDARD NOTATION SCHEMATIC
Howard W. Sams & Co., Inc. 1958

PHOTOFACT* Folder
*TRADE MARK
EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

# SILVERTONE MODELS 7226, 8226 (Ch. 528.45800)

SILVERTONE MODELS 7226, 8226 (Ch. 528.45800)

SILVERTONE MODELS 7226, 8226 (Ch. 528.45800)

| | |
|---|---|
| TRADE NAME | Silvertone Models 7226, 8226 (Ch. 528.45800) |
| SUPPLIER | Sears, Roebuck & Co., 925 S. Homan Ave., Chicago, Illinois |
| TYPE SET | Three Power Portable 8 Band AM Receiver |
| TUBES (Five) | Types 1U4 RF Amplifier, 1L6 Converter, 1U4 IF Amplifier, 1U5 Det.-AVC-AF Amp., 3V4 Output |
| POWER SUPPLY | 110-120 Volts AC-DC (or) 9 Volts "A" Supply & 90 Volts "B" Supply in Pack Form |
| RATING | .15 Amp. @ 117 Volts AC (or) 70MA @ 9 Volts DC & 16MA @ 90 Volts DC (11 Watts) |

TUNING RANGE

| | | | |
|---|---|---|---|
| Band 1 | 540-1600KC | Band 5 | 9.22-10.4MC |
| Band 2 | 17.32-18.4MC | Band 6 | 3.9-8.0MC |
| Band 3 | 14.62-15.8MC | Band 7 | 1.8-3.9MC |
| Band 4 | 11.42-12.4MC | Band 8 | 155-410KC |

PROPERTY OF

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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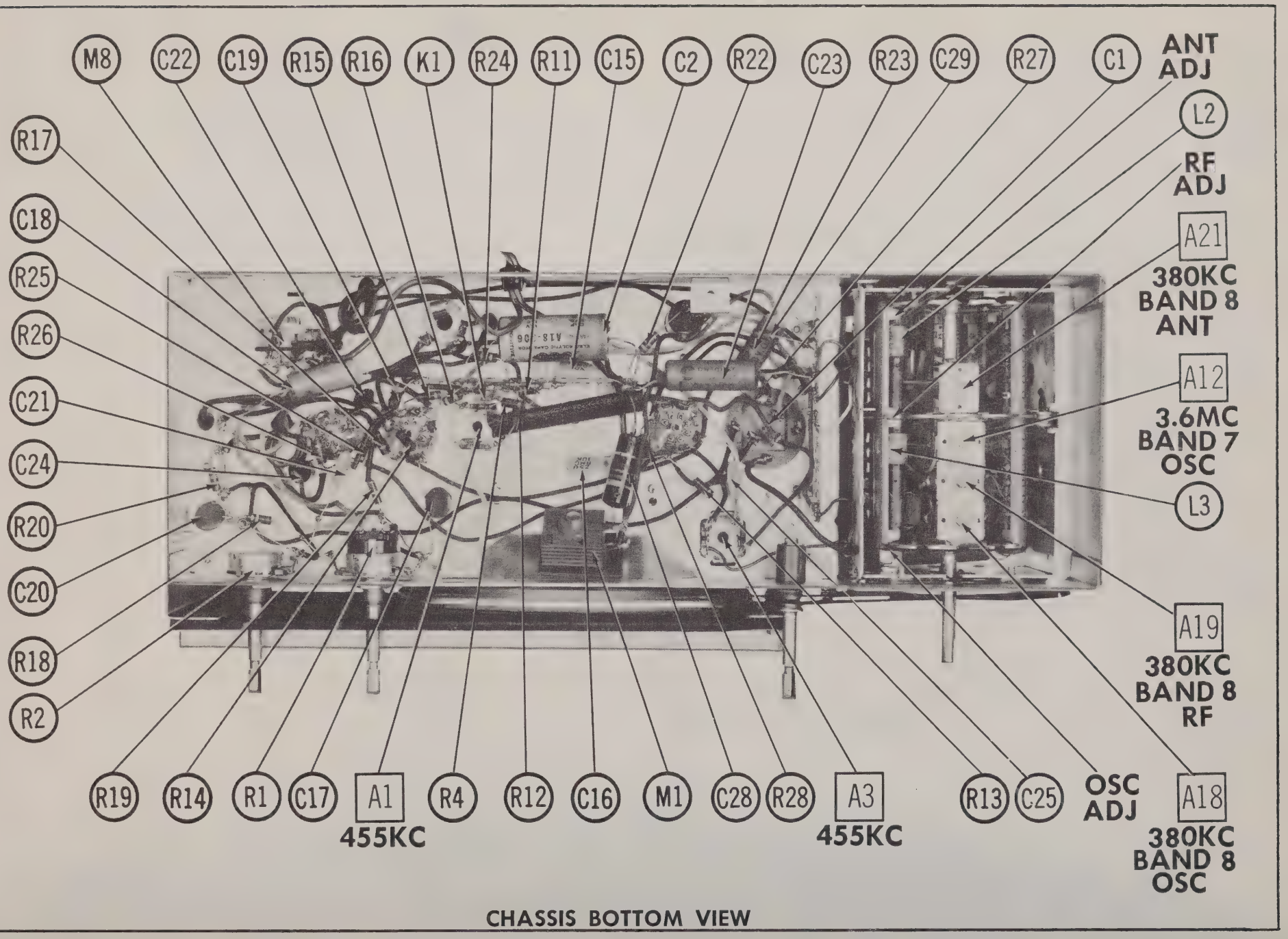
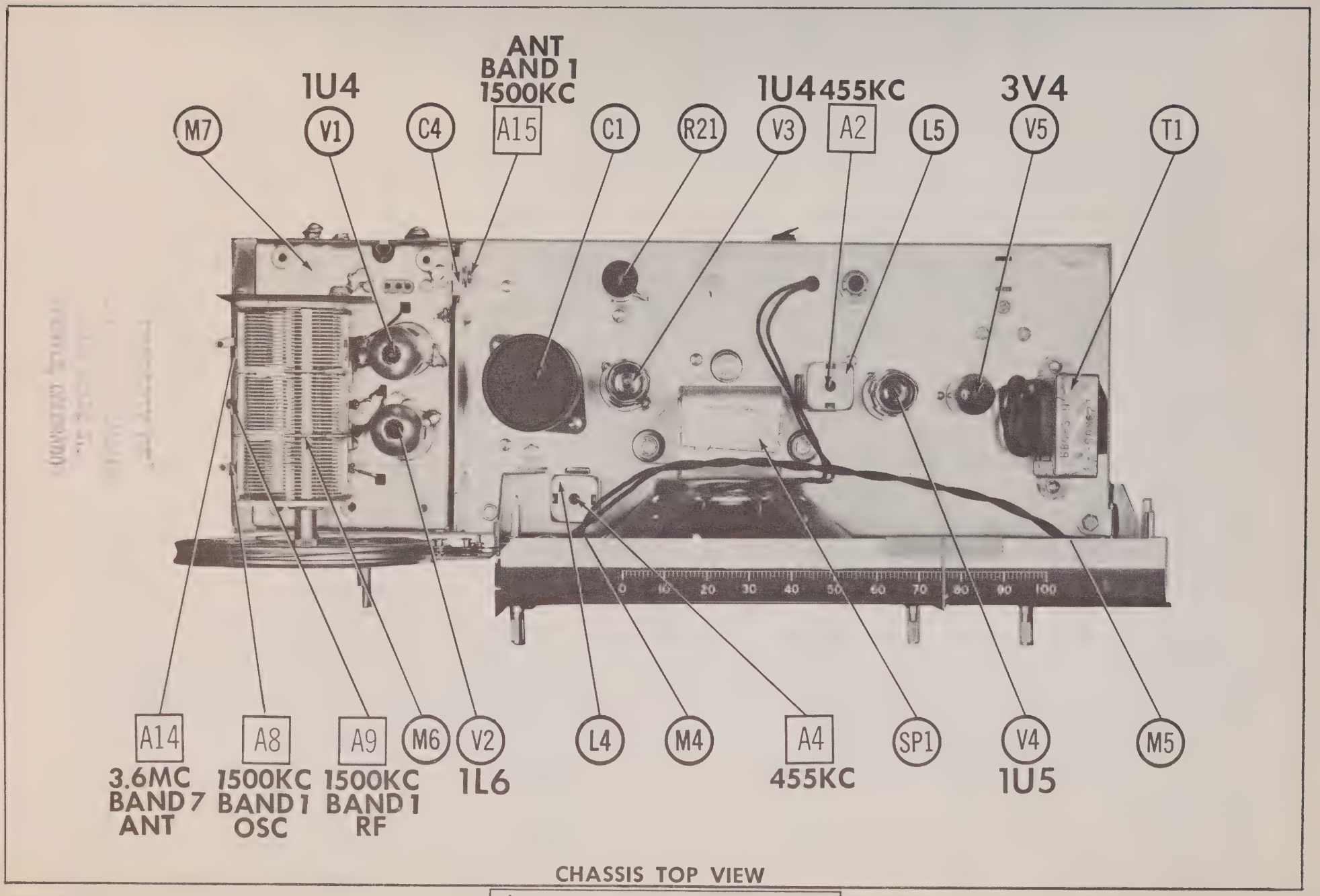
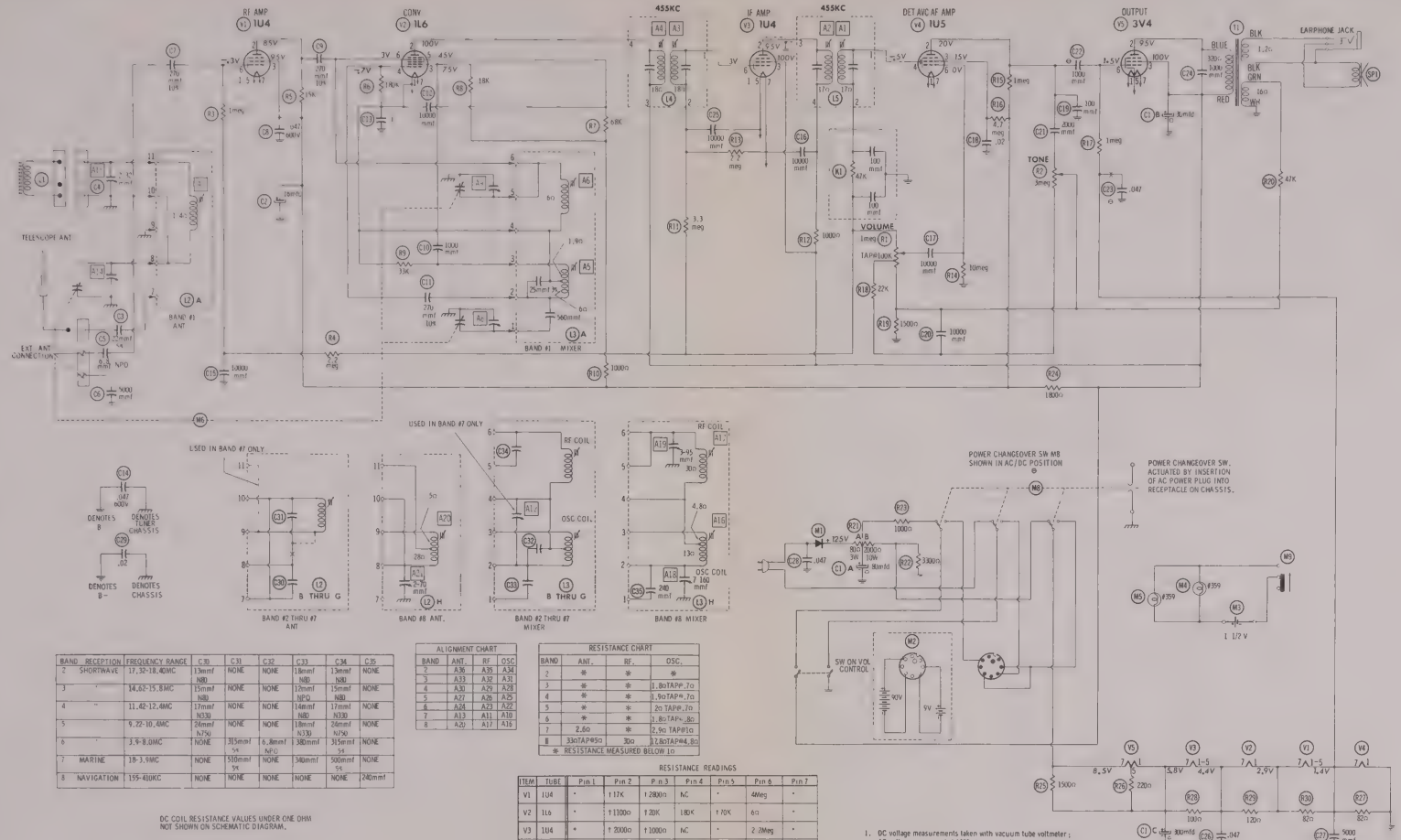



CHASSIS BOTTOM VIEW




CHASSIS TOP VIEW




| BAND | RECEPTION | FREQUENCY RANGE | C30 | C31 | C32 | C33 | C34 | C35 |
|---|---|---|---|---|---|---|---|---|
| 2 | SHORTWAVE | 17.32-18.40MC | 13mmf N80 | NONE | NONE | 18mmf N80 | 13mmf N80 | NONE |
| 3 | " | 14.62-15.8MC | 15mmf N80 | NONE | NONE | 12mmf NPO | 15mmf N80 | NONE |
| 4 | " | 11.42-12.4MC | 17mmf N330 | NONE | NONE | 14mmf N80 | 17mmf N330 | NONE |
| 5 | " | 9.22-10.4MC | 24mmf N750 | NONE | NONE | 18mmf N330 | 24mmf N750 | NONE |
| 6 | " | 3.9-8.0MC | NONE | 315mmf 5% | 6.8mmf NPO | 330mmf 5% | 315mmf 5% | NONE |
| 7 | MARINE | 18-3.9MC | NONE | 510mmf 5% | NONE | 340mmf | 500mmf 5% | NONE |
| 8 | NAVIGATION | 155-410KC | NONE | NONE | NONE | NONE | NONE | 240mmf |

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM.

●SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

| ALIGNMENT CHART | | | | |
|---|---|---|---|---|
| BAND | ANT. | RF | OSC |
| 2 | A36 | A35 | A34 |
| 3 | A33 | A32 | A31 |
| 4 | A30 | A29 | A28 |
| 5 | A27 | A26 | A25 |
| 6 | A24 | A23 | A22 |
| 7 | A13 | A11 | A10 |
| 8 | A20 | A17 | A16 |

| RESISTANCE CHART | | | |
|---|---|---|---|
| BAND | ANT. | RF. | OSC. |
| 2 | * | * | * |
| 3 | * | * | 1.8ΩTAP@.7Ω |
| 4 | * | * | 1.9ΩTAP@.7Ω |
| 5 | * | * | 2Ω TAP@.7Ω |
| 6 | * | * | 1.8ΩTAP@.8Ω |
| 7 | 2.6Ω | * | 2.9Ω TAP@1Ω |
| 8 | 33ΩTAP@5Ω | 3Ω | 12.8ΩTAP@4.8Ω |

* RESISTANCE MEASURED BELOW 1Ω

RESISTANCE READINGS

| ITEM | TUBE | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 |
|---|---|---|---|---|---|---|---|---|
| V1 | 1U4 | * | ↑17K | ↑2800Ω | NC | * | 4Meg | * |
| V2 | 1L6 | * | ↑1100Ω | ↑20K | 18K | ↑70K | 6Ω | * |
| V3 | 1U4 | * | ↑2000Ω | ↑1000Ω | NC | * | 2.2Meg | * |
| V4 | 1U5 | * | ↑1Meg | ↑4.7Meg | 1Meg | NC | 10Meg | * |
| V5 | 3V4 | * | ↑1400Ω | ↑1100Ω | TP | * | 1Meg | * |

ALL MEASUREMENTS TAKEN IN BAND 1 (BROADCAST) POSITION
* DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE
↑ MEASURED FROM OUTPUT OF M1
NC NO CONNECTION

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements

A PHOTOFACT STANDARD NOTATION SCHEMATIC
Howard W. Sams & Co., Inc. 1958

385-10

# ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.
Use an insulated alignment screwdriver for adjusting.
Oscillator and image frequencies should appear above input signal frequency on bands 1, 7, & 8.
Oscillator and image frequencies should appear below input signal frequency on bands 2, 3, 4, 5 & 6.
Antenna coil strip must be removed to gain access to RF coil adjustments. Replace strip after making RF adjustment.

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | BAND SWITCH POS. | RADIO DIAL SETTING | OUTPUT METER | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 1. | 0.1MFD | High side to RF stator lug of tuning gang. Low side to B-. | 455KC (400~ Mod) | 1 | Tuning gang fully closed | Across voice coil | A1, A2, A3, A4 | Adjust for maximum output. If AC power is used without an isolation transformer, reduce dummy antenna to 200MMF to reduce hum modulation. |
| 2. | | Loop | 600KC | 1 | 600KC | " | A5, A6 | Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output. |
| 3. | | " | 1500KC | 1 | 1500KC | " | A8, A9 | Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output. Repeat steps 2 & 3 until no further improvement is noted. |
| 4. | Fig. 1 | Thru dummy to whip antenna socket. | 1.8MC | 7 | 1.8MC | " | A10, A11 | Adjust for maximum output. |
| 5. | " | " | 3.6MC | 7 | 3.6MC | " | A12 | Adjust for maximum output. Repeat steps 4 & 5 until no further improvement is noted. |
| 6. | " | " | 1.8MC | 7 | 1.8MC | " | A13 | Adjust for maximum output. |
| 7. | " | " | 3.6MC | 7 | 3.6MC | " | A14 | Adjust for maximum output. Repeat steps 6 & 7 until no further improvement is noted. |
| 8. | | Loop | 600KC | 1 | 600KC | " | A7 | Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output. |
| 9. | | " | 1500KC | 1 | 1500KC | " | A15 | Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output. Repeat steps 8 & 9 until no further improvement is noted. |
| 10. | | " | 190KC | 8 | 190KC | " | A16, A17 | Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output. |
| 11. | | " | 380KC | 8 | 380KC | " | A18, A19 | Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output. Repeat steps 10 & 11 until no further improvement is noted. |
| 12. | | " | 190KC | 8 | 190KC | " | A20 | Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output. |
| 13. | | " | 380KC | 8 | 380KC | " | A21 | Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output. Repeat steps 12 & 13 until no further improvement is noted. |
| 14. | Fig. 1 | Thru dummy to whip antenna socket. | 4MC | 6 | 4MC | " | A22, A23 | Adjust for maximum output. |
| 15. | " | " | " | 6 | " | " | A24 | " |
| 16. | " | " | 9.3MC | 5 | 9.3MC | " | A25, A26 | " |
| 17. | " | " | " | 5 | " | " | A27 | " |
| 18. | " | " | 11.5MC | 4 | 11.5MC | " | A28, A29 | " |
| 19. | " | " | " | 4 | " | " | A30 | " |
| 20. | " | " | 14.7MC | 3 | 14.7MC | " | A31, A32 | " |
| 21. | " | " | " | 3 | " | " | A33 | " |
| 22. | " | " | 17.4MC | 2 | 17.4MC | " | A34, A35 | " |
| 23. | " | " | " | 2 | " | " | A36 | " |

| BAND | ANT. ADJ. | RF ADJ. | OSC. ADJ. |
|---|---|---|---|
| 1 | A7 | A6 | A5 |
| 2 | A36 | A35 | A34 |
| 3 | A33 | A32 | A31 |
| 4 | A30 | A29 | A28 |
| 5 | A27 | A26 | A25 |
| 6 | A24 | A23 | A22 |
| 7 | A13 | A11 | A10 |
| 8 | A20 | A17 | A16 |

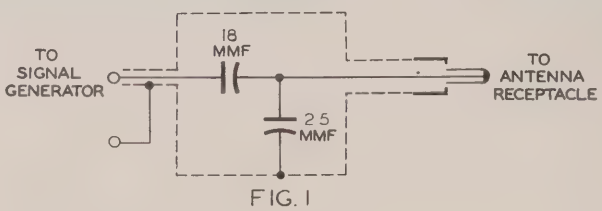


FIG. 1

# PARTS LIST AND DESCRIPTIONS

## TUBES ( GENERAL ELECTRIC, SYLVANIA )

| ITEM No. | USE | TYPE | NOTES |
|---|---|---|---|
| V1 | RF Amplifier | 1U4 | |
| V2 | Converter | 1L6 | |
| V3 | IF Amplifier | 1U4 | |

| ITEM No. | USE | TYPE | NOTES |
|---|---|---|---|
| V4 | Det. - AVC - AF Amp. | 1U5 | |
| V5 | Output | 3V4 | |

## ELECTROLYTIC CAPACITORS

| ITEM No. | RATING CAP. | RATING VOLT. | REPLACEMENT DATA SILVERTONE PART No. | AEROVOX PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | PYRAMID PART No. | SANGAMO PART No. | SPRAGUE PART No. |
|---|---|---|---|---|---|---|---|---|---|
| C1A | ▲80 | 150 | 18-9-3 | AFH3-82-40 | XC0604 | FP311.15 | | Q-005 | TVL-3431.8 |
| B | ■30 | 150 | | | | | | MTH-2525 | |
| C | ▲300 | 25 | | | | | | | |
| C2 | 16 | 150 | 18-14-0 | PRS150V16 | BBR16-150 | TC44 | TD-16-150 | MT-1516 | TVA-1409 |

## FIXED CAPACITORS

**Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.**

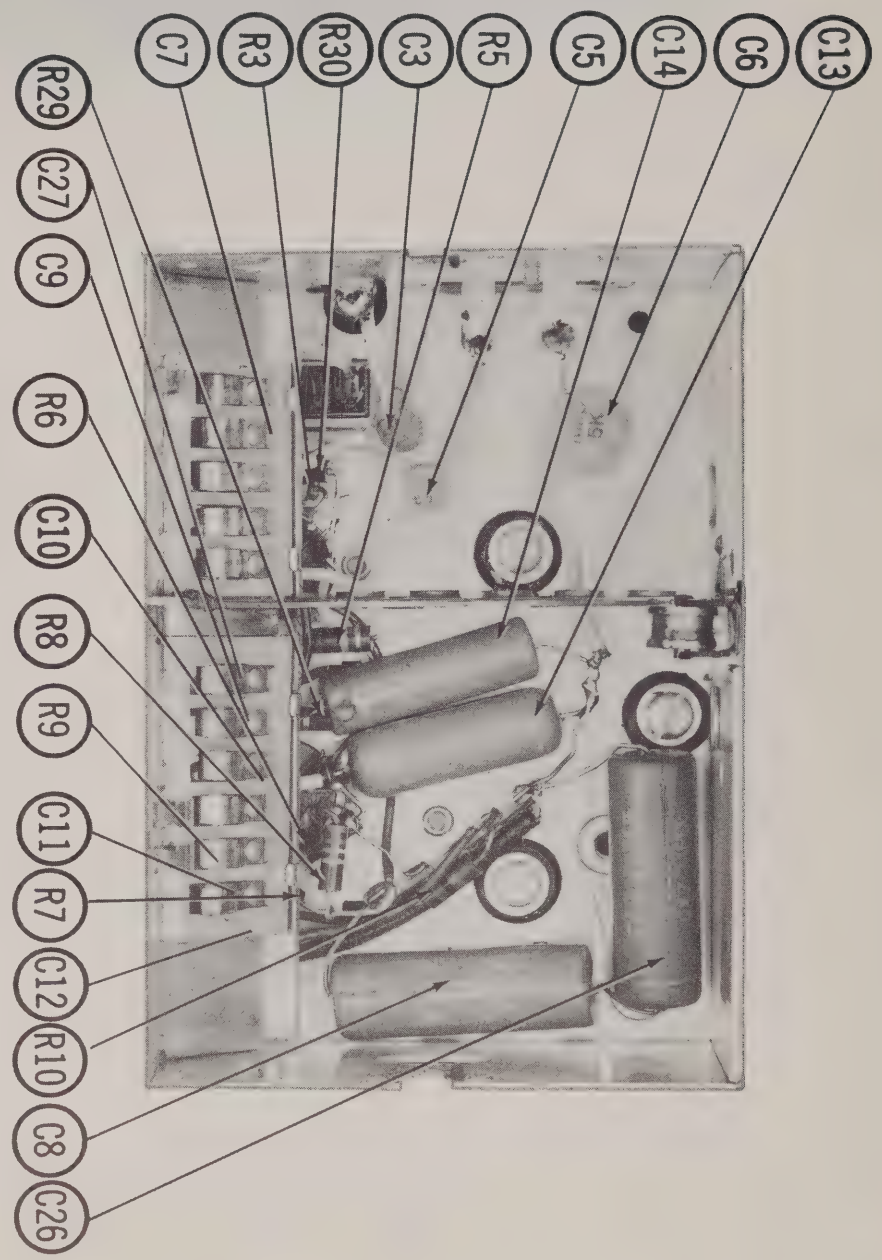
| ITEM No. | RATING CAP. | RATING VOLT | REPLACEMENT DATA SILVERTONE PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | ERIE PART No. | MALLORY PART No. | SPRAGUE PART No. | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| C3 | 22 | | 13L8GP220J | NPO-DI 22 | TCZ-22 | C10Q22C | TCO-22 | | 5TCC-Q22 | 5% |
| C4 | 2-32 | | 13F225 | | | | | | | |
| C5 | 6.8 | | 13L8C6R8D | NPO-DI 6.8 | TCZ-6R8 | C10V68C | TCO-6.8 | ZT-5568 | 5TCCB-V68 | NPO |
| C6 | 5000 | | 13L17X502Z | BPD-005 | DD-502 | BYA10D5 | ED-005 | DC525 | 5HK-D5 | |
| C7 | 270 | | 13L12D271K | NPO-SI 270 | D6-271 | L10T27 | ED-270 | | MS-327 | 10% |
| C8 | .047 | 600 | 13A041 | P688N-047 | DF-503 | CUB6S47 | | GEM-6147 | 6TM-S47 | |
| C9 | 270 | | 13L12D271K | NPO-SI 270 | D6-271 | L10T27 | ED-270 | | MS-327 | 10% |
| C10 | 1000 | | 13L8X102Z | BPD-001 | DD-102 | BYA6D1 | ED-1000 | DC521 | 5HK-D1 | |
| C11 | 270 | | 13L12D271K | NPO-SI 270 | D6-271 | L10T27 | ED-270 | | MS-327 | 10% |
| C12 | 10000 | | 13L20X103Z | BPD-01 | DD-103 | BYA6S1 | ED-01 | DC511 | 5HK-S1 | |
| C13 | .1 | 200 | 13A030 | P288N-1 | DF-104 | CUB2P1 | | GEM-201 | 2TM-P1 | |
| C14 | .047 | 600 | 13A041 | P688N-047 | DF-503 | CUB6S47 | | GEM-6147 | 6TM-S47 | |
| C15 | 10000 | | 15-10317 | BPD-01 | DD-103 | BYA6S1 | ED-01 | DC511 | 5HK-S1 | |
| C16 | 10000 | | 15-10317 | BPD-01 | DD-103 | BYA6S1 | ED-01 | DC511 | 5HK-S1 | |
| C17 | 10000 | | 15-10317 | BPD-01 | DD-103 | BYA6S1 | ED-01 | DC511 | 5HK-S1 | |
| C18 | .02 | 400 | 16-20343 | P488N-02 | DD-203 | CUB4S2 | ED-02 | GEM-412 | 4TM-S2 | |
| C19 | 100 | | 15-10166 | SI 100 | D6-101 | LT6T1 | GP-100 | UC-531 | 5GA-T1 | |
| C20 | 10000 | | 15-10316 | BPD-01 | DD-103 | BYA6S1 | ED-01 | DC511 | 5HK-S1 | |
| C21 | 2000 | | 15-20216 | BPD-002 | DD-202 | BYA10D2 | ED-002 | DC522 | 5HK-D2 | |
| C22 | 1000 | | 15-10217 | BPD-001 | DD-102 | BYA6D1 | ED-1000 | DC521 | 5HK-D1 | ① |
| C23 | .047 | 400 | 16-47343 | P488N-047 | DF-503 | CUB4S47 | | GEM-4147 | 4TM-S47 | ② |
| C24 | 1000 | | 15-10217 | BPD-001 | DD-102 | BYA6D1 | ED-1000 | DC521 | 5HK-D1 | |
| C25 | 10000 | | 15-10317 | BPD-01 | DD-103 | BYA6S1 | ED-01 | DC511 | 5HK-S1 | |
| C26 | .047 | 400 | 16-47343 | P488N-047 | DF-503 | CUB4S47 | | GEM-4147 | 4TM-S47 | |
| C27 | 5000 | | 13L17X502Z | BPD-005 | DD-502 | BYA10D5 | ED-005 | DC525 | 5HK-D5 | |
| C28 | .047 | 400 | 20-447-1 | P488N-047 | DF-503 | CUB4S47 | | GEM-4147 | 4TM-S47 | |
| C29 | .02 | 400 | 16-20343 | P488N-02 | DD-203 | CUB4S2 | ED-02 | GEM-412 | 4TM-S2 | |

① Some versions use 10000MMF in this application (Part #15-10316).
② Not used in some versions.

## CONTROLS

| ITEM No. | RATING RESISTANCE | RATING WATTS | REPLACEMENT DATA SILVERTONE PART No. | CENTRALAB PART No. | CLAROSTAT PART No. | IRC PART No. | MALLORY PART No. | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|
| R1A | 1Meg | ½ | 24-236 | BT-7417 | A47F3-1Meg | Q18-137X | UT-440 | Volume, Tap ③ 100K |
| B | Shaft | | | Not Req. | KSS-3 | Not Req. | Not Req. | |
| C | Switch | | | KB-1 | SWE-12 | 76-1 | US-26 | |
| R2 | 3Meg | ½ | 26-137 | B-855 | | Q17-140 | | Tone |

## TUNER CHASSIS - BOTTOM VIEW



# PARTS LIST AND DESCRIPTIONS (Continued)

## RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

| ITEM No. | RATING OHMS | RATING WATT | SILVERTONE PART No. | NOTES |
|---|---|---|---|---|
| R3 | 1Meg | | 12TAE105K | |
| R4 | 2.2Meg | | 60-22501 | |
| R5 | 15K | | 12TAE153K | |
| R6 | 180K | | 12TAE184K | |
| R7 | 68K | | 12TAE683K | |
| R8 | 18K | | 12TAE183K | |
| R9 | 33K | | 12TAE333K | |
| R10 | 1000Ω | | 12TAE102M | |
| R11 | 3.3Meg | | 60-33501 | |
| R12 | 1000Ω | | 60-10201 | |
| R13 | 2.2Meg | | 60-22501 | |
| R14 | 10Meg | | 60-10601 | |
| R15 | 1Meg | | 60-10501 | |
| R16 | 4.7Meg | | 60-47501 | |
| R17 | 1Meg | | 60-10501 | |
| R18 | 22K | | 60-22301 | |
| R19 | 1500Ω | | 60-15201 | |
| R20 | 47K | | 60-47301 | |
| R21A | 80Ω | 3 | 61-45 | |
| B | 2000Ω | 10 | | |
| R22 | 3300Ω | | 60-33201 | |
| R23 | 1000Ω | | 60-10201 | |
| R24 | 1800Ω | | 60-18201 | |
| R25 | 1500Ω | | 60-15201 | |
| R26 | 220Ω | | 60-22101 | |
| R27 | 82Ω | | 60-82001 | |
| R28 | 100Ω | | 60-10101 | |
| R29 | 120Ω | | 12TAE121K | |
| R30 | 82Ω | | 12TAE820K | |

## TRANSFORMER (AUDIO OUTPUT)

| ITEM No. | IMPEDANCE PRI. | IMPEDANCE SEC.1 | REPLACEMENT DATA SILVERTONE PART No. | Halldorson PART No. | Merit PART No. | Stancor PART No. | Thordarson PART No. | Triad PART No. | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| T1 | 8300Ω | 3-4Ω | 80-369 | | | | | | |
| | Turns Ratio PRI. | SEC.2 | | | | | | | |
| | 8: | 1 | | | | | | | |

## SPEAKER

| ITEM No. | TYPE SIZE | TYPE FIELD | TYPE V. C. IMP. | REPLACEMENT DATA SILVERTONE PART No. | REPLACEMENT DATA QUAM PART No. | NOTES |
|---|---|---|---|---|---|---|
| SP1 | 6" | PM | 3-4Ω | 79-462 | 6A21 | |

## COILS (RF-IF)

| ITEM No. | USE | REPLACEMENT DATA SILVERTONE PART No. | MEISSNER PART No. | MERIT PART No. | MILLER PART No. | NOTES |
|---|---|---|---|---|---|---|
| L1 | Loop Stick | 84-2331 | | | | |
| L2A | Ant. Coil | 95-96 | | | | Band 1 (540-1600KC) |
| B | Ant. Coil | 95-97 | | | | Band 2 (17.32-18.4MC) |
| C | Ant. Coil | 95-98 | | | | Band 3 (14.62-15.8MC) |
| D | Ant. Coil | 95-99 | | | | Band 4 (11.42-12.4MC) |
| E | Ant. Coil | 95-100 | | | | Band 5 (9.22-10.4MC) |
| F | Ant. Coil | 95-101 | | | | Band 6 (3.9-8.0MC) |
| G | Ant. Coil | 95-102 | | | | Band 7 (1.8-3.9MC) |
| H | Ant. Coil | 95-103 | | | | Band 8 (155-410KC) |
| L3A | Mixer, Osc. Coils | 95-104 | | | | Band 1 |
| B | Mixer, Osc. Coils | 95-105 | | | | Band 2 |
| C | Mixer, Osc. Coils | 95-106 | | | | Band 3 |
| D | Mixer, Osc. Coils | 95-107 | | | | Band 4 |
| E | Mixer, Osc. Coils | 95-108 | | | | Band 5 |
| F | Mixer, Osc. Coils | 95-109 | | | | Band 6 |
| G | Mixer, Osc. Coils | 95-110 | | | | Band 7 |
| H | Mixer, Osc. Coils | 95-111 | | | | Band 8 |
| L4 | Input IF | 10-32-2 | 16-6758 | BC-352 | 12-C1 | |
| L5 | Output IF | 10-43-2 | 16-6758 | BC-353 | 12-C2 | |

## COMPONENT COMBINATIONS

| ITEM No. | USE | DESCRIPTION | SILVERTONE PART No. | REPLACEMENT DATA | |
|---|---|---|---|---|---|
| K1 | Diode RF Filter | 100MMF, 100MMF, 47K | 13-1-2 | Aerovox | PA-97-1 |
| | | | | Centralab | PC-50 |
| | | | | Cornell-Dubilier | 111TM1 |
| | | | | Erie | 1403-01 |
| | | | | Sprague | D-1 |

# PARTS LIST AND DESCRIPTIONS (Continued)

## RECTIFIERS

| ITEM No. | RATING CURRENT (Measured) | REPLACEMENT DATA SILVERTONE PART No. | FEDERAL PART No. | INTERNATIONAL PART No. | SARKES TARZIAN PART No. | NOTES |
|---|---|---|---|---|---|---|
| M1 | .067A | 83-568 | 1003A | RS075 | 75 | |

## BATTERIES

| ITEM No. | VOLTAGE | SILVERTONE PART No. | REPLACEMENT DATA BURGESS "A-B" Pack | EVEREADY "A-B" Pack | MALLORY "A-B" Pack | RAY-O-VAC "A-B" Pack | NOTES |
|---|---|---|---|---|---|---|---|
| M2 | 9V "A" 90V "B" | 6407 | F6A60 | 753 | A401 | 401 | |

## BATTERIES

| ITEM No. | VOLTAGE | SILVERTONE PART No. | REPLACEMENT DATA BURGESS "A" | BURGESS "B" | EVEREADY "A" | EVEREADY "B" | MALLORY "A" | MALLORY "B" | RAY-O-VAC "A" | RAY-O-VAC "B" | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|---|
| M3 | 1½V | 4650 | 2R | | 950 | | M-13 | | 2LP | | Note 1 |

Note 1. Used for dial lamp power.

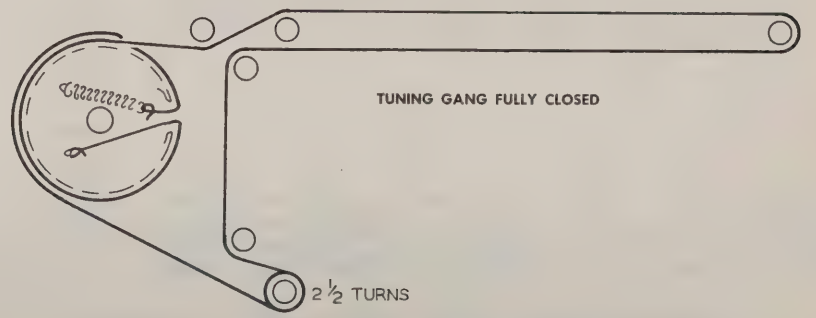
## MISCELLANEOUS

| ITEM No. | PART NAME | SILVERTONE PART No. | NOTES |
|---|---|---|---|
| M4 | Dial Lamp | 89-14 | #359 |
| M5 | Dial Lamp | 89-14 | #359 |
| M6 | Tuning Cap. | 13G013 | 3 Gang (Ant. 15-505MMF) (RF 15-505MMF) (Osc. 15-505MMF) |
| M7 | Tuner | 95-78 | Complete |
| M8 | Switch | 69-186 | AC-DC-Battery (Rotary Wafer Type) |
| | Switch | 69-185 | AC-DC-Battery (Alternate) |
| M9 | Switch | 69-212 | Dial Light (Slide Type SPST) |
| | Whip Antenna | 82-103 | Shortwave |

## CABINETS & CABINET PARTS

**(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)**

| NAME | PART NO. | DESCRIPTION |
|---|---|---|
| Escutcheon | 40-296 | Dial Scale |
| Knob | 52-641 | Band Selector |
| Knob | 52-640 | On-Off-Volume, Tone & Tuning |
| Cabinet | 42-812 | Complete |
| Dial Pointer | 58-122 | |




DIAL CORD STRINGING

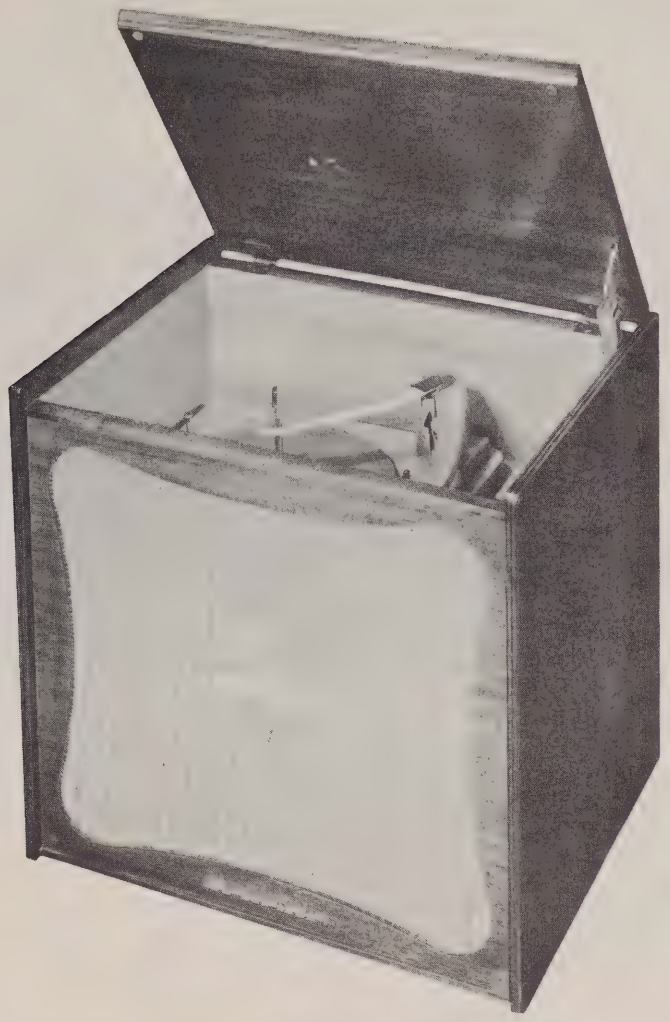
PHOTOFACT* Folder

*TRADE MARK

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

# STROMBERG-CARLSON MODELS AF-501B, C, M, AF-502B, M, W

STROMBERG-CARLSON MODELS AF-501B, C, M, AF-502B, M, W



STROMBERG-CARLSON MODELS AF-501B, C, M, AF-502B, M, W

| | |
|---|---|
| TRADE NAME | Stromberg-Carlson Models AF-501B, C, M, AF-502B, M, W |
| MANUFACTURER | Stromberg-Carlson Co., Sound Div., 1225 Clifford Ave., Rochester 21, N.Y. |
| TYPE SET | AC Operated Phono Amplifier With 4 Speed Automatic Record Changer |
| TUBES (Five) | Types 6AV6 AF Amplifier, 12AX7 AF Amp.-Phase Inv., (2) 6V6GT Output, 6X5GT Rectifier |
| POWER SUPPLY | 110-120 Volts AC-60 Cycle RATING .45 Amp. @ 117 Volts AC (45 Watts) |

FOR SERVICE INFORMATION ON RECORD CHANGER PART #171000-046 (Models AF-501B, C, M) OR RECORD CHANGER PART #171000-047( Models AF-502B, M, W) - SEE V-M MODEL 1200A - PHOTOFACT SET 353 — FOLDER 16.

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FOLDER 11

# PARTS LIST AND DESCRIPTIONS

STROMBERG-CARLSON
MODEL AF-501B

## TUBES ( GENERAL ELECTRIC, SYLVANIA )

| ITEM No. | USE | TYPE | NOTES |
|---|---|---|---|
| V1 | AF Amplifier | 6AV6 | |
| V2 | AF Amp. -Phase Inv. | 12AX7 | |
| V3 | Output | 6V6GT | |

| ITEM No. | USE | TYPE | NOTES |
|---|---|---|---|
| V4 | Output | 6V6GT | |
| V5 | Rectifier | 6X5GT | |

## ELECTROLYTIC CAPACITORS

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | CAP. | VOLT. | Stromberg-Carlson PART No. | AEROVOX PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | PYRAMID PART No. | SANGAMO PART No. | SPRAGUE PART No. |
| C1A | ▬20 | 450 | 111090-000 | AFH4-76 | D0624 | FP430.2 | TM2-90 | Q-370 | TVL-4731 |
| B | ■20 | 450 | | | | | | | |
| C | ▲40 | 350 | | | | | | | |
| D | 25 | 25 | | | | | | | |

## FIXED CAPACITORS

**Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.**

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| | CAP. | VOLT | Stromberg-Carlson PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | ERIE PART No. | MALLORY PART No. | SPRAGUE PART No. | |
| C2 | 4700 | | | BPD-0047 | DD-472 | BYA10D47 | ED-0047 | UC-5247 | 5HK-D47 | |
| C3 | 10000 | | | BPD-01 | DD-103 | BYA6S1 | ED-01 | DC511 | 5HK-S1 | |
| C4 | .05 | 400 | | P488N-05 | DF-503 | CUB4S5 | | GEM-415 | 4TM-S5 | |
| C5 | 4700 | | | BPD-0047 | DD-472 | BYA10D47 | ED-0047 | UC-5247 | 5HK-D47 | |
| C6 | 220 | | | BPD-00022 | DD-221 | LI0T22 | ED-220 | UC-5322 | 5GA-T22 | |
| C7 | 1000 | | | BPD-001 | DD-102 | BYA6D1 | ED-1000 | DC521 | 5HK-D1 | |
| C8 | 4700 | | | BPD-0047 | DD-472 | BYA10D47 | ED-4700 | UC-5247 | 5HK-D47 | |
| C9 | .02 | 400 | | P488N-02 | DD-203 | CUB4S2 | ED-02 | GEM-412 | 4TM-S2 | |
| C10 | .02 | 400 | | P488N-02 | DD-203 | CUB4S2 | ED-02 | GEM-412 | 4TM-S2 | |
| C11 | 4700 | | | BPD-0047 | DD-472 | BYA10D47 | ED-4700 | UC-5247 | 5HK-D47 | |
| C12 | 4700 | | | BPD-0047 | DD-472 | BYA10D47 | ED-4700 | UC-5247 | 5HK-D47 | |
| C13 | .01 | 600 | | P688N-01 | D6-103 | CUB6S1 | GP-10000 | GEM-611 | 6TM-S1 | |

## CONTROLS

| ITEM No. | RATING | | REPLACEMENT DATA | | | | | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|
| | RESISTANCE | WATTS | Stromberg-Carlson PART No. | CENTRALAB PART No. | CLAROSTAT PART No. | IRC PART No. | MALLORY PART No. | |
| R1 | 1Meg | | 145201-000 | | | | | Volume, tap @400K |
| R2A | 1Meg | | 145203-000 | B-70 | A47-1Meg-Z | Q13-137 | U53 | Treble |
| B | Shaft | | | Not Req. | FS-3 | Not Req. | Not Req. | |
| R3 | 1Meg | | 145202-000 | | | | | Bass |

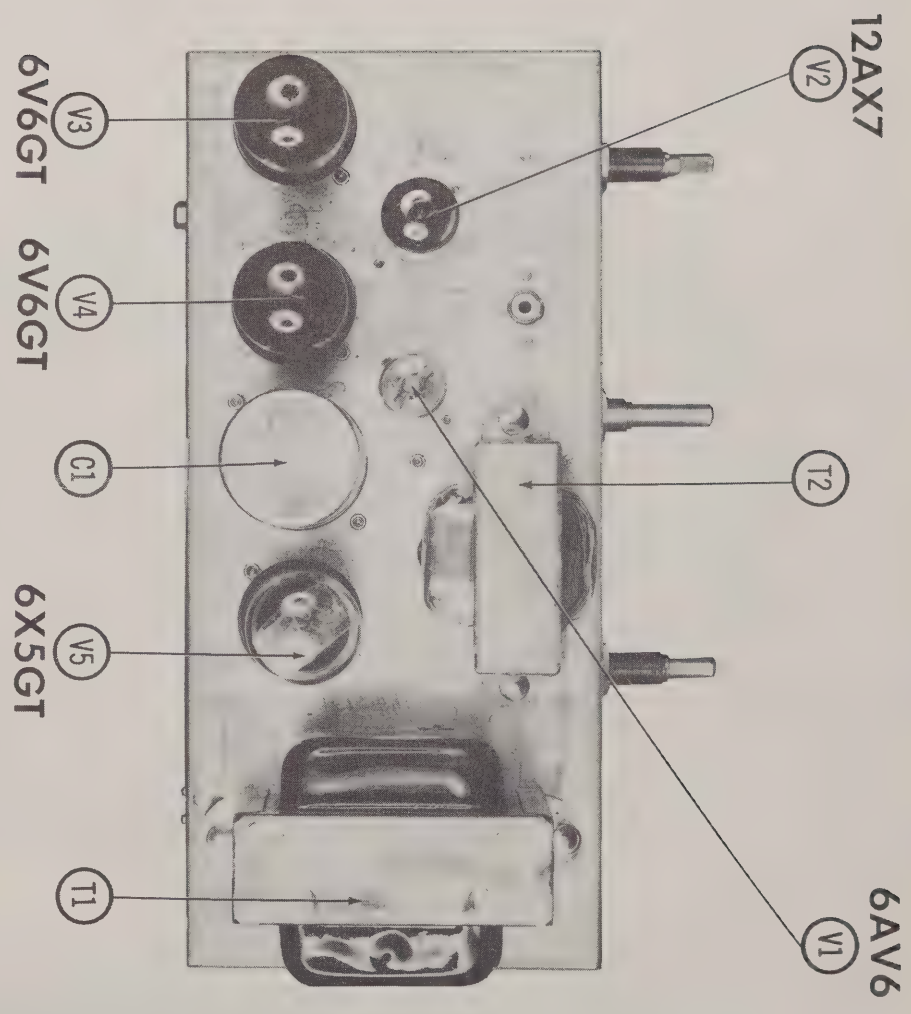
## RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

| ITEM No. | RATING | | Stromberg-Carlson PART No. | NOTES |
|---|---|---|---|---|
| | OHMS | WATT | | |
| R4 | 47K | | | |
| R5 | 4.7Meg | | | |
| R6 | 470K | | | |
| R7 | 470K | | | |
| R8 | 5600Ω | | | |
| R9 | 47K | | | |
| R10 | 220K | | | |
| R11 | 4700Ω | | | |
| R12 | 100K | | | |

| ITEM No. | RATING | | Stromberg-Carlson PART No. | NOTES |
|---|---|---|---|---|
| | OHMS | WATT | | |
| R13 | 27K | | | |
| R14 | 220K | | | |
| R15 | 6800Ω | | | |
| R16 | 1000Ω | | | |
| R17 | 470K | | | |
| R18 | 1000Ω | | | |
| R19 | 470K | | | |
| R20 | 390Ω | 2 | | |
| R21 | 5600Ω | 2 | | |
| R22 | 10K | | | |

# CHASSIS—TOP VIEW



# PARTS LIST AND DESCRIPTIONS (Continued)

## TRANSFORMER (POWER)

| ITEM No. | RATING | | | | REPLACEMENT DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | PRI. | SEC. 1 | SEC. 2 | SEC. 3 | Stromberg-Carlson PART No. | Halldorson PART No. | Merit PART No. | Stancor PART No. | Thordarson PART No. | Triad PART No. |
| T1 | 117VAC @ .45A | 620VCT @ .060A | 6.3VAC @ 2A | | 161455-000 | | | | | |

## TRANSFORMER (AUDIO OUTPUT)

| ITEM No. | IMPEDANCE | | REPLACEMENT DATA | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| | PRI. | SEC. | Stromberg-Carlson PART No. | Halldorson PART No. | Merit PART No. | Stancor PART No. | Thordarson PART No. | Triad PART No. | |
| T2 | 6400Ω CT | 3-4Ω | 161295 | Z1011 | A-2935 | A-3824 | 24S55 | S-55X | |

## SPEAKER

| ITEM No. | TYPE | | | REPLACEMENT DATA | | NOTES |
|---|---|---|---|---|---|---|
| | SIZE | FIELD | V. C. IMP. | Stromberg-Carlson PART No. | QUAM PART No. | |
| SP1 | 8" | PM | 6-8Ω | 155718 ① | 8A6PA ① | ① Parallel and phase. |
| SP2 | 8" | PM | 6-8Ω | 155718 ① | 8A6PA ① | ② Alternate part number used in Models AF-502B, M, W |
| | 8" | PM | | 100928 ①② | | ③ Used in Models AF-501B, C, M |
| | 12" | PM | | 155865 ③ | | |
| | 8" | PM | | 155875 ③ | | |

## PHONO CARTRIDGE

| ITEM No. | REPLACEMENT DATA | | | | | REMARKS |
|---|---|---|---|---|---|---|
| | Stromberg-Carlson PART No. | ASTATIC PART No. | | ELECTRO-VOICE PART No. | | |
| | | CARTRIDGE | NEEDLE | CARTRIDGE | MOUNT | |
| M1 | 171000-043 | 55-T or 81-TB | GD-J | 56 | PT-1 | |

ASTATIC NEEDLE LISTING SHOWN ABOVE IS SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGE LISTED . FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENTS SEE BELOW.

## PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

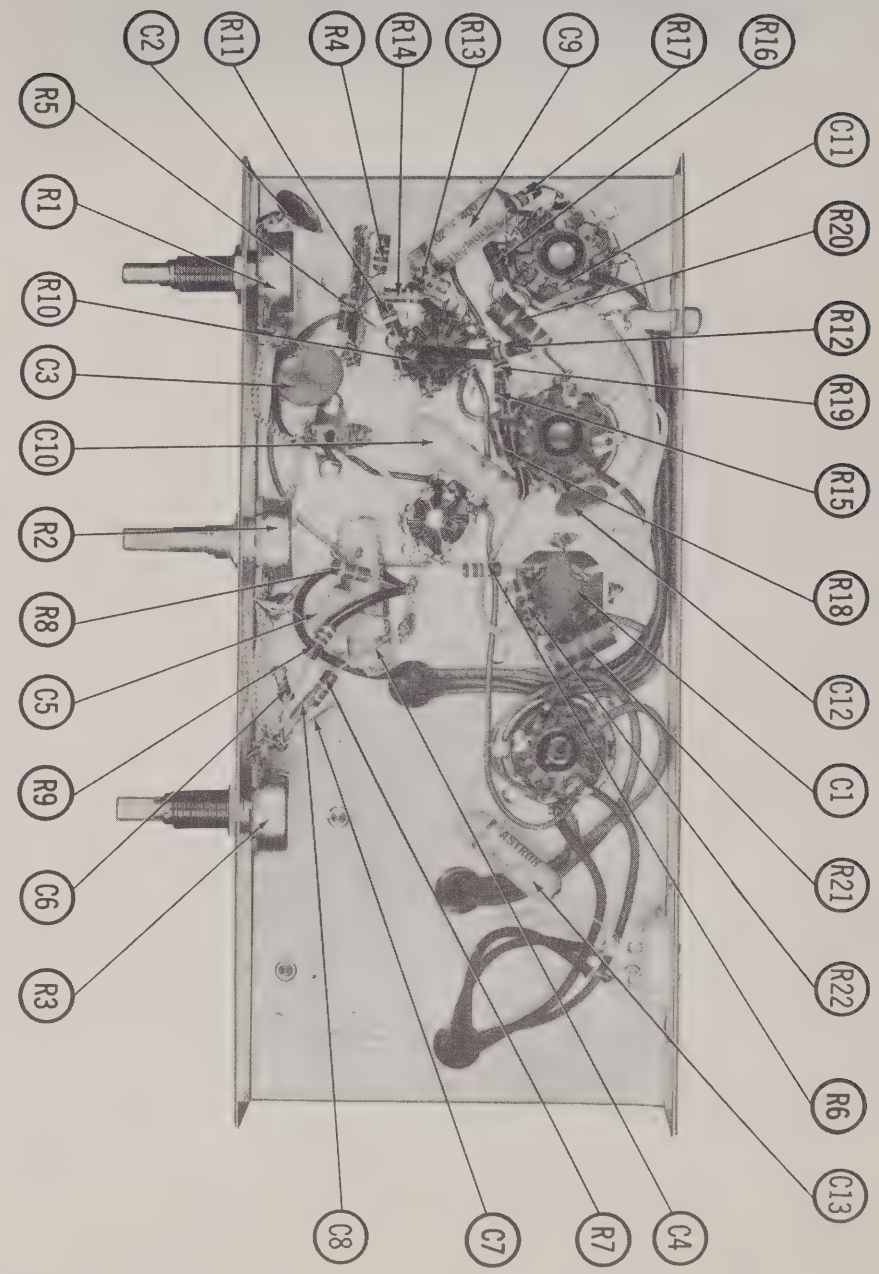
| ITEM No. | REPLACEMENT DATA | | | REMARKS |
|---|---|---|---|---|
| | Stromberg-Carlson PART No. | JENSEN PART No. | WALCO PART No. | |
| M2 | 171000-041 | *JP-35 or †JPS-35 or †♦JPS-35SD or ♦JPS-35D | *W35TPA or †W35TPS or ♦W35DS or ♦W35TPD | * Metal<br>† Jewel<br>♦ Diamond |

## CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

| NAME | PART NO. | DESCRIPTION |
|---|---|---|
| Knob | 134306-000 | Volume, bass and treble |
| Cabinet | 108000-003 | Mahogany, Model AF-502M |
| Cabinet | 108000-002 | Blonde, Model AF-502B |
| Cabinet | 108000-001 | Walnut, Model AF-502W |
| Cabinet | 108000-008 | Blonde, Model AF-501B |
| Cabinet | 108584-000 | Cherry, Model AF-501C |
| Cabinet | 108000-006 | Mahogany, Model AF-501M |

## CHASSIS—BOTTOM VIEW

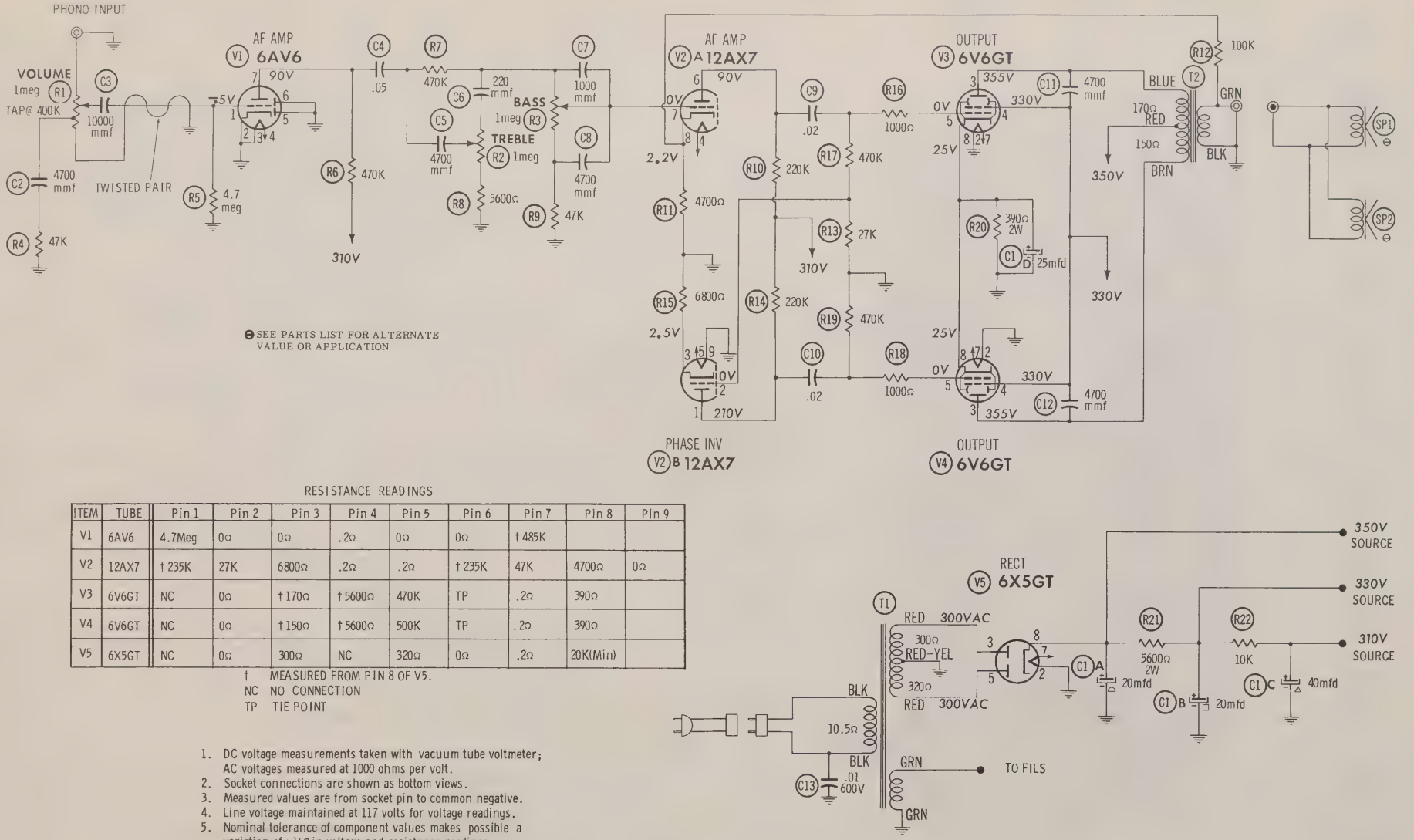





FOLDER 11

STROMBERG-CARLSON MODEL AF-501B

STROMBERG-CARLSON MODEL AF-501B




⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

RESISTANCE READINGS

| ITEM | TUBE | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 | Pin 8 | Pin 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| V1 | 6AV6 | 4.7Meg | 0Ω | 0Ω | .2Ω | 0Ω | 0Ω | †485K | | |
| V2 | 12AX7 | †235K | 27K | 6800Ω | .2Ω | .2Ω | †235K | 47K | 4700Ω | 0Ω |
| V3 | 6V6GT | NC | 0Ω | †170Ω | †5600Ω | 470K | TP | .2Ω | 390Ω | |
| V4 | 6V6GT | NC | 0Ω | †150Ω | †5600Ω | 500K | TP | .2Ω | 390Ω | |
| V5 | 6X5GT | NC | 0Ω | 300Ω | NC | 320Ω | 0Ω | .2Ω | 20K(Min) | |

† MEASURED FROM PIN 8 OF V5.
NC NO CONNECTION
TP TIE POINT




1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

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# ZENITH MODELS A402L, V, Y (Ch. 4A41)

ZENITH MODELS A402L, V, Y (Ch. 4A41)

ZENITH MODELS A402L, V, Y (Ch. 4A41)

| | |
|---|---|
| TRADE NAME | Zenith Models A402L, A402V, A402Y (Ch. 4A41) |
| MANUFACTURER | Zenith Radio Corp., 6001 Dickens Ave., Chicago 39, Illinois |
| TYPE SET | Three Power Portable AM Receiver |
| TUBES (Four) | Types 1R5 Converter, 1U4 IF Amplifier, 1U5 Det.-AVC-AF Amp., 3V4 Output |
| POWER SUPPLY | 110-120 Volts AC-DC (or) 7.5 Volts "A" Supply & 90 Volts "B" Supply |
| RATING | .15 Amp. @ 117 Volts AC (or) 52MA @ 7.5 Volts DC & 14MA @ 90 Volts DC |
| TUNING RANGE—BROADCAST | 535KC - 1620KC |

## ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use battery power, if possible. If AC power is used, use an isolation transformer when available. If not, connect a .1MFD capacitor in series with low side of the signal generator and B-.
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

| | DUMMY ANTENNA | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | RADIO DIAL SETTING | OUTPUT METER | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|
| 1. | .5MFD | High side to pin 6 (grid) of 1R5 (V1). Low side to B-. | 455KC (400∿Mod) | 600KC | Across voice coil | A1, A2, A3, A4 | Adjust for maximum output. If AC power is used without an isolation transformer, reduce dummy antenna to 200MMF to reduce hum modulation. |
| 2. | | Loop | 1600KC | Tune to 1600KC signal | " | A5 | Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output. |
| 3. | | " | 1400KC | Tune to 1400KC signal | " | A6 | " |

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# PARTS LIST AND DESCRIPTIONS



## TUBES ( GENERAL ELECTRIC, SYLVANIA)

| ITEM No. | USE | TYPE | NOTES |
|---|---|---|---|
| V1 | Converter | 1R5 | |
| V2 | IF Amplifier | 1U4 | |
| V3 | Det.-AVC-AF Amp. | 1U5 | |
| V4 | Output | 3V4 | |

## ELECTROLYTIC CAPACITORS

| ITEM No. | RATING CAP. | RATING VOLT. | REPLACEMENT DATA ZENITH PART No. | AEROVOX PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | PYRAMID PART No. | SANGAMO PART No. | SPRAGUE PART No. |
|---|---|---|---|---|---|---|---|---|---|
| C1A | ■80 | 150 | 22-2886 | AFH3-64-65 | C0120 | FP302.5 | | T-225 | R2313* |
| B | ▲60 | 150 | | | BR2501 | | | MT-1580 | |
| C | 200 | 10 | | | | | | | |

* Non-catalog item.

## FIXED CAPACITORS

**Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.**

| ITEM No. | RATING CAP. | RATING VOLT | REPLACEMENT DATA ZENITH PART No. | AEROVOX PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | ERIE PART No. | MALLORY PART No. | SPRAGUE PART No. | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| C2 | 470 | 1000 | 22-6 | HVD-15-470 | DD-471 | BYA10T47 | HD15-470 | | 5GA-T47 | |
| C3 | 100 | | 22-5 | BPD-0001 | DD-101 | L10T1 | ED-100 | UC-531 | 5GA-T1 | |
| C4 | 4700 | | 22-4 | BPD-0047 | DD-472 | BYA10D47 | ED-0047 | UC-5247 | 5GA-D47 | |
| C5 | .022 | 200 | 22-2804 | P288N-022 | DD-203 | CUB4S22 | ED-02 | GEM-4122 | 2TM-S22 | |
| C6 | 10000 | | 22-3 | BPD-01 | DD-103 | BYA6S1 | ED-01 | DC511 | 5HK-S1 | |
| C7 | 4700 | | 22-4 | BPD-0047 | DD-472 | BYA10D47 | ED-0047 | UC-5247 | 5GA-D47 | |
| C8 | 100 | | 22-5 | BPD-0001 | DD-101 | L10T1 | ED-100 | UC-531 | 5GA-T1 | |
| C9 | 4700 | | 22-4 | BPD-0047 | DD-472 | BYA10D47 | ED-0047 | UC-5247 | 5GA-D47 | |
| C10 | 4700 | | 22-14 | | | 1R5D47 | CY30C472K | | MS-247 | 10% |
| C11 | .1 | 200 | 22-2780 | P288N-1 | DF-104 | CUB2P1 | | GEM-201 | 2TM-P1 | |
| C12 | 10000 | | 22-3 | BPD-01 | DD-103 | BYA6S1 | ED-01 | DC511 | 5HK-S1 | |
| C13 | .047 | 200 | 22-2792 | P288N-047 | DF-503 | CUB2S47 | | GEM-2147 | 2TM-S47 | |
| C14 | 10000 | | 22-3 | BPD-01 | DD-103 | BYA6S1 | ED-01 | DC511 | 5HK-S1 | |

## CONTROLS

| ITEM No. | RATING RESISTANCE | RATING WATTS | REPLACEMENT DATA ZENITH PART No. | CENTRALAB PART No. | CLAROSTAT PART No. | IRC PART No. | MALLORY PART No. | INSTALLATION NOTES |
|---|---|---|---|---|---|---|---|---|
| R1A | 1Meg | ½ | 63-3985 | AB-69 | A47-1Meg-S | Q11-137 | U54 | Volume |
| B | Shaft | | | AK-7 | FS-3 | Not Req. | Not Req. | |
| C | Switch | | | KB-2 | SWE-20 | 76-2 | US-27 | |

## RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

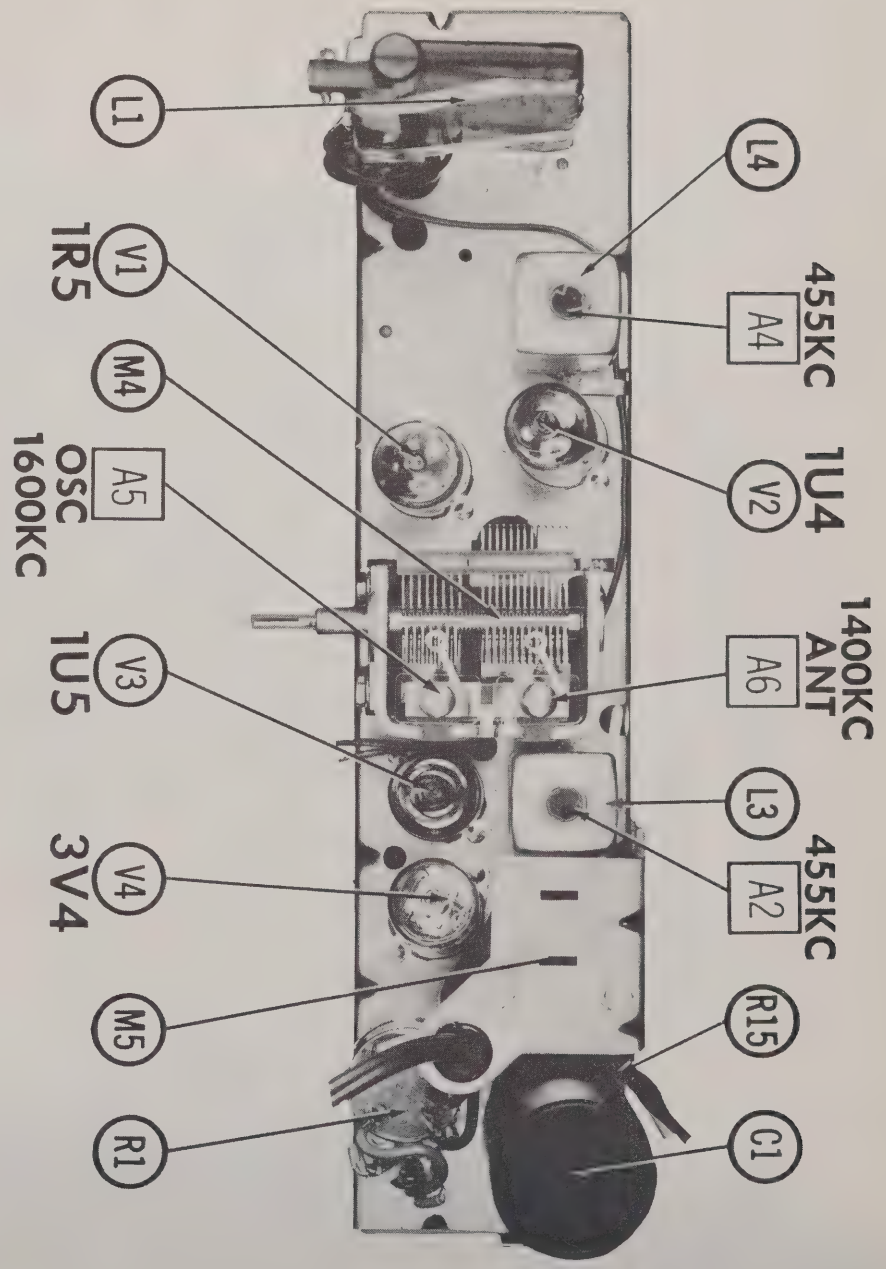
| ITEM No. | RATING OHMS | RATING WATT | ZENITH PART No. | NOTES |
|---|---|---|---|---|
| R2 | 100K | | 63-1870 | |
| R3 | 1Meg | | 63-1912 | |
| R4 | 4.7Meg | | 63-1940 | |
| R5 | 3900Ω | | 63-1810 | |
| R6 | 1Meg | | 63-1912 | |
| R7 | 4.7Meg | | 63-1940 | |
| R8 | 1Meg | | 63-1912 | |

| ITEM No. | RATING OHMS | RATING WATT | ZENITH PART No. | NOTES |
|---|---|---|---|---|
| R9 | 4.7Meg | | 63-1940 | |
| R10 | 180Ω | | 63-1754 | |
| R11 | 2.2Meg | | 63-1926 | |
| R12 | 680Ω | | 63-1778 | |
| R13 | 180Ω | 4 | 63-2821 | |
| R14 | 1750Ω | 4 | 63-3987 | |
| R15 | 680Ω | | 63-1778 | |

## TRANSFORMER (AUDIO OUTPUT)

| ITEM No. | IMPEDANCE PRI. | IMPEDANCE SEC. | REPLACEMENT DATA ZENITH PART No. | Halldorson PART No. | Merit PART No. | Stancor PART No. | Thordarson PART No. | Triad PART No. | NOTES |
|---|---|---|---|---|---|---|---|---|---|
| T1 | 9700Ω | 3-4Ω | 95-1548 | | A-2998① | A-3329① | 24S83 ① | S-11X ① | ① Bend ears down. |

## CHASSIS—TOP VIEW



# PARTS LIST AND DESCRIPTIONS (Continued)

## SPEAKER

| ITEM No. | TYPE | | | REPLACEMENT DATA | | NOTES |
|---|---|---|---|---|---|---|
| | SIZE | FIELD | V. C. IMP. | ZENITH PART No. | QUAM PART No. | |
| SP1 | 4" | PM | 3-4Ω | 49-822 | 4A1 | |

## COILS (RF-IF)

| ITEM No. | USE | REPLACEMENT DATA | | | | NOTES |
|---|---|---|---|---|---|---|
| | | ZENITH PART No. | MEISSNER PART No. | MERIT PART No. | MILLER PART No. | |
| L1 | Loop Sitck | S-41355 | | | | * Fabricate mounting. Disregard tap. |
| L2 | Osc. Coil | S-41365 | 14-1074 | BC-387 * | 70-OSC * | |
| L3 | Input IF | 95-1547 | 16-6780 | BC-356 | 13-PC7 | |
| L4 | Output IF | 95-1484 | | | | |

## RECTIFIER

| ITEM No. | RATING | REPLACEMENT DATA | | | | NOTES |
|---|---|---|---|---|---|---|
| | CURRENT (Measured) | ZENITH PART No. | FEDERAL PART No. | INTERNATIONAL PART No. | SARKES TARZIAN PART No. | |
| M1 | .064A | 212-20 ① | 1003A | RS075 | 75 | ① Alternate part #212-5. |

## BATTERIES

| ITEM No. | VOLTAGE | ZENITH PART No. | REPLACEMENT DATA | | | | | | | | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | BURGESS | | EVEREADY | | MALLORY | | RAY-O-VAC | | |
| | | | "A" | "B" | "A" | "B" | "A" | "B" | "A" | "B" | |
| M2 | 7½V | Z-707 | D5 | | 707 | | M-26 | | 26 | | |
| M3 | 90V | Z-495 | | P60 | | 495 | | M-214 | | | |

## MISCELLANEOUS

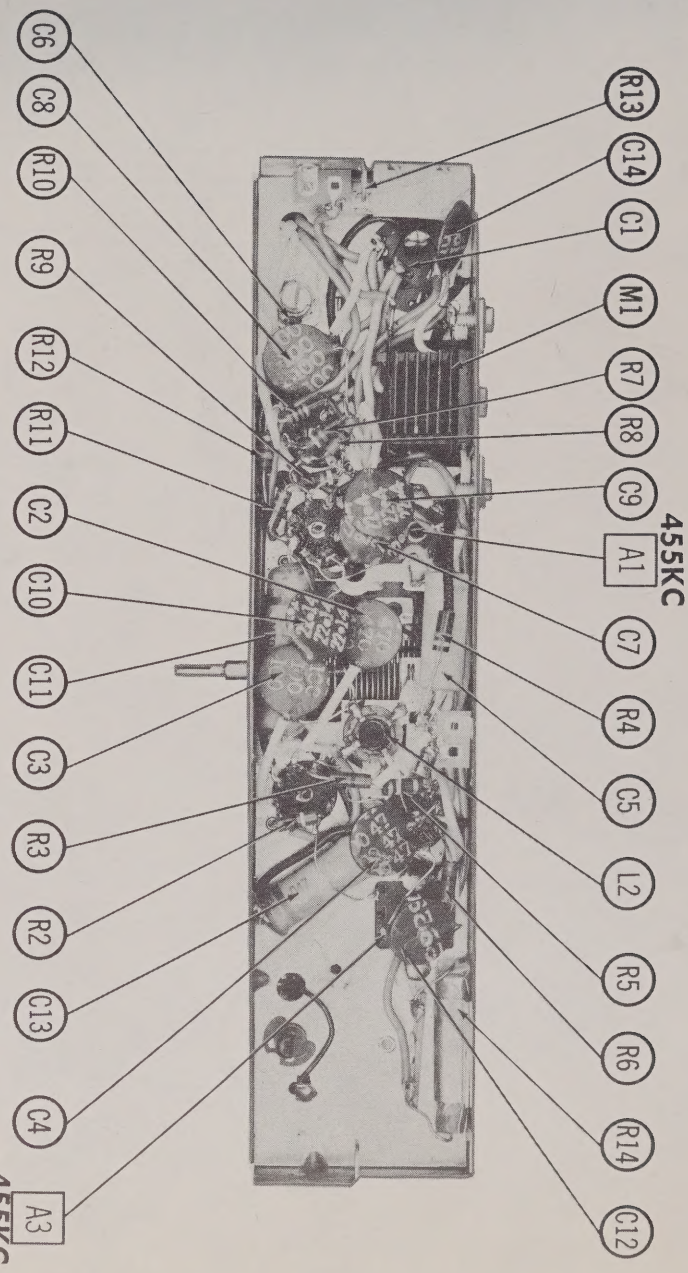
| ITEM No. | PART NAME | ZENITH PART No. | NOTES |
|---|---|---|---|
| M4 | Tuning Cap. | 22-2947 | 2 Gang (Ant. 15-350MMF, Osc. 15-105MMF) |
| M5 | Switch | 85-587 | Power Changeover (Rotary Wafer Type) |

## CABINETS & CABINET PARTS

**(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)**

| NAME | PART NO. | DESCRIPTION |
|---|---|---|
| Knob | 46-1752 | Tuning, Model A402L |
| Knob | 46-1753 | Tuning, Model A402Y |
| Knob | 46-1754 | Tuning, Model A402V |
| Knob | 46-1758 | On-off-volume, Model A402Y |
| Knob | 46-1759 | On-off-volume, Models A402V, A402L |
| Knob | 46-1764 | Antenna, Model A402Y |
| Knob | 46-1765 | Antenna, Models A402V, A402L |
| Cabinet | 14-2185 | Front Section, Model A402Y |
| Cabinet | 14-2186 | Front Section, Models A402V, A402L |
| Cabinet | 14-2191 | Rear Section, Model A402L |
| Cabinet | 14-2192 | Rear Section, Model A402Y |
| Cabinet | 14-2193 | Rear Section, Model A402V |
| Handle | 36-172 | Model A402L |
| Handle | 36-173 | Model A402Y |
| Handle | 36-175 | Model A402V |
| Dial Scale | 26-587 | |
| Dial Pointer | 59-323 | |

# CHASSIS—BOTTOM VIEW

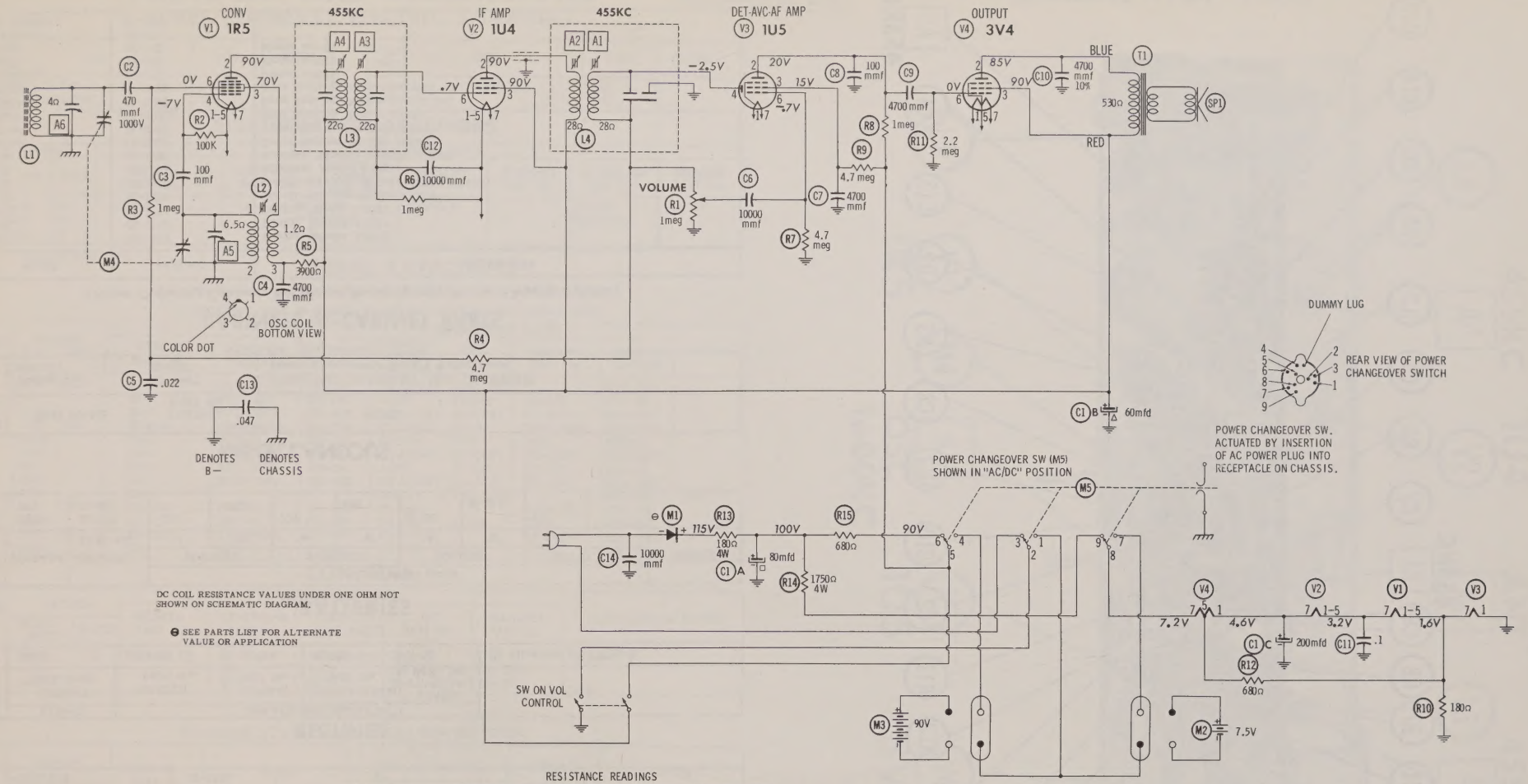





FOLDER 12

ZENITH MODEL A402L (Ch. 4A41)

ZENITH MODEL A402L (Ch. 4A41)




DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM.

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

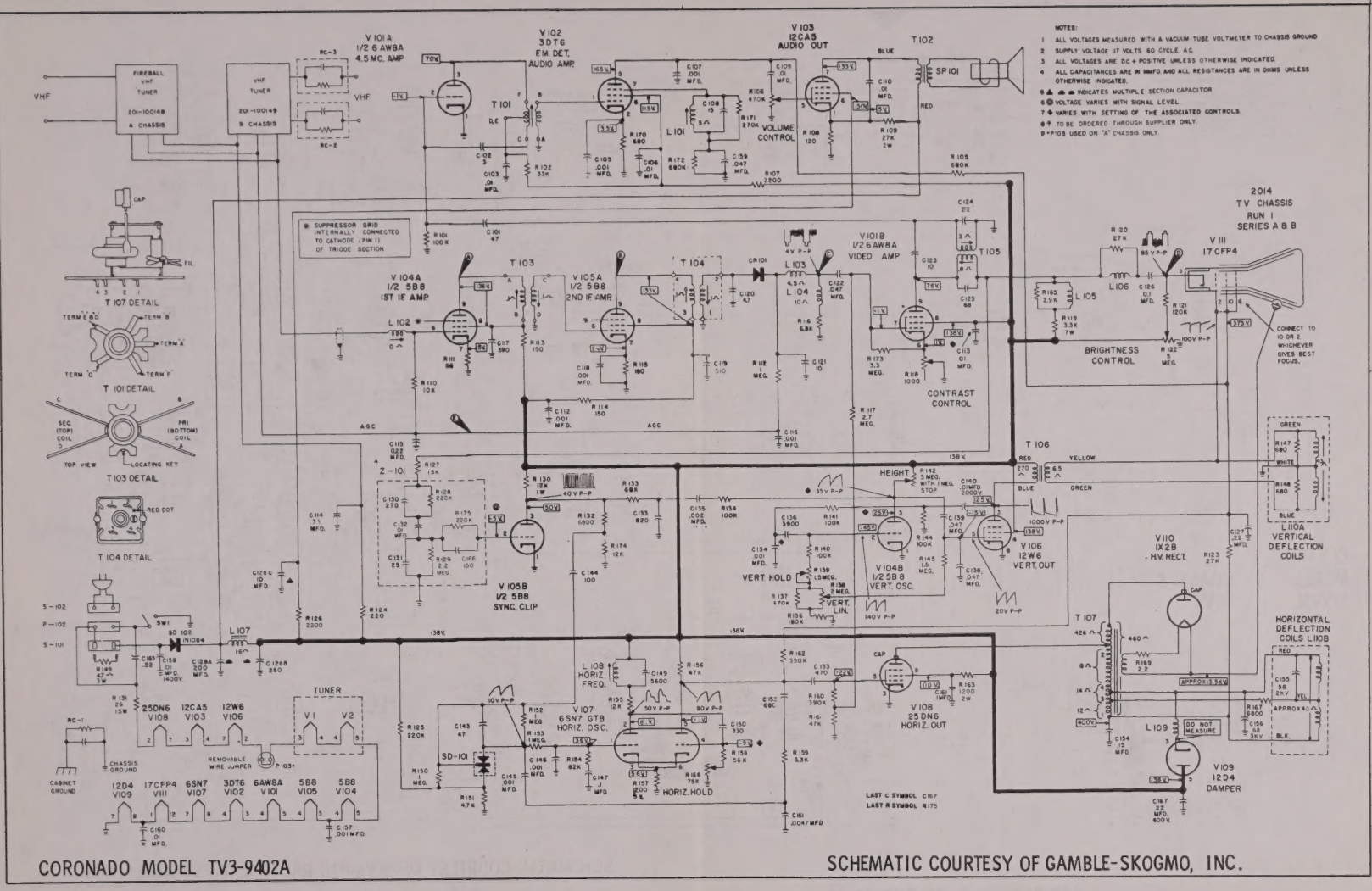
RESISTANCE READINGS

| ITEM | TUBE | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Pin 6 | Pin 7 |
|---|---|---|---|---|---|---|---|---|
| V1 | 1R5 | * | †880Ω | †4700Ω | 100K | * | 6.7Meg | * |
| V2 | 1U4 | * | †880Ω | †860Ω | TP | * | 1Meg | * |
| V3 | 1U5 | * | †1Meg | †4.7Meg | 1Meg | TP | 4.7Meg | * |
| V4 | 3V4 | * | †1400Ω | †860Ω | TP | * | 2.2Meg | * |

* DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE.
† MEASURED FROM OUTPUT OF M1.
TP TIE POINT.

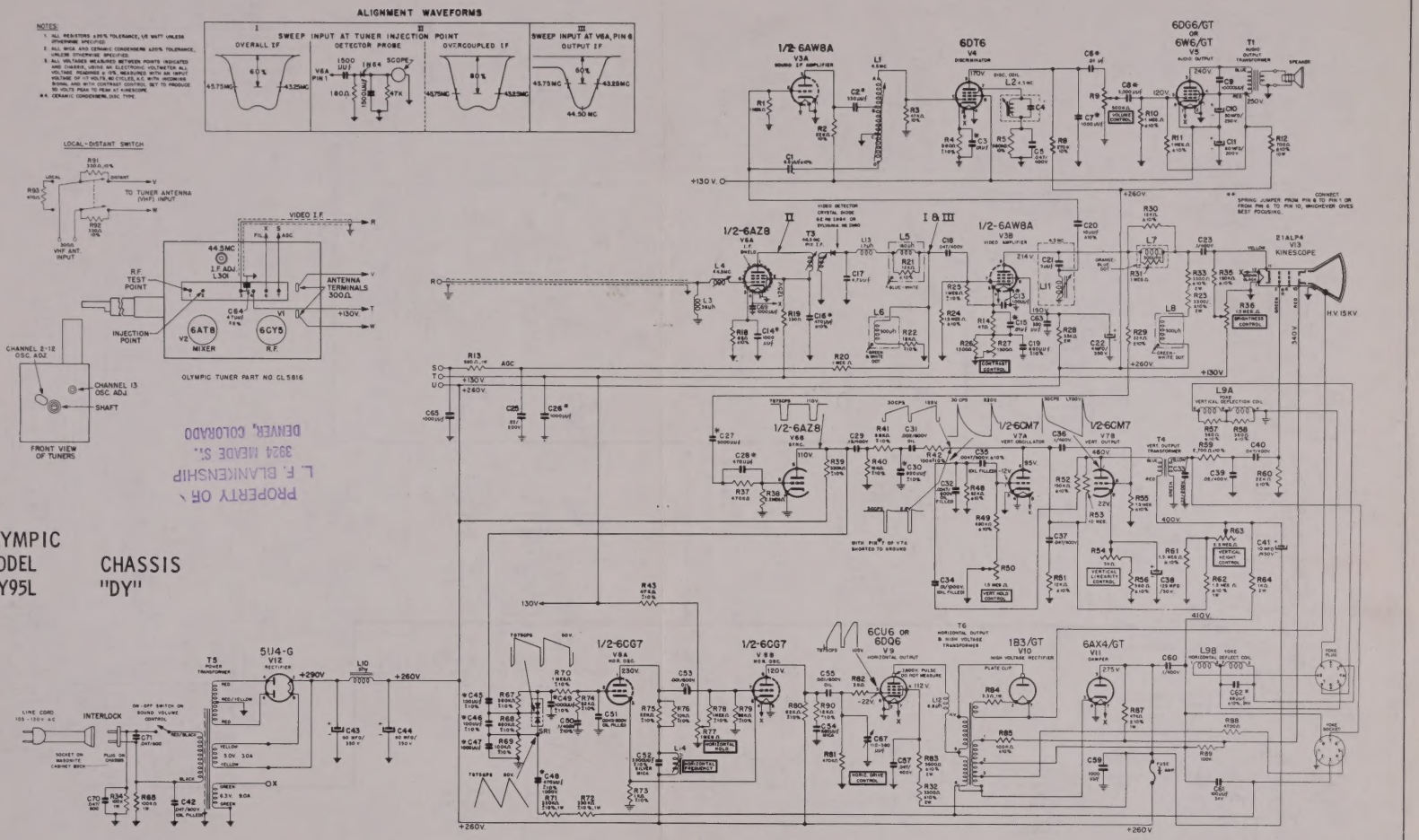
1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
5. Volume control at maximum. no signal apllied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
Howard W. Sams & Co., Inc. 1958


NOTES:
1 ALL VOLTAGES MEASURED WITH A VACUUM TUBE VOLTMETER TO CHASSIS GROUND
2 SUPPLY VOLTAGE 117 VOLTS 60 CYCLE A.C.
3 ALL VOLTAGES ARE DC + POSITIVE UNLESS OTHERWISE INDICATED.
4 ALL CAPACITANCES ARE IN MMFD AND ALL RESISTANCES ARE IN OHMS UNLESS OTHERWISE INDICATED.
5 ▲ ▲ ▲ INDICATES MULTIPLE SECTION CAPACITOR
6 ◎ VOLTAGE VARIES WITH SIGNAL LEVEL.
7 ◆ VARIES WITH SETTING OF THE ASSOCIATED CONTROLS.
8 * TO BE ORDERED THROUGH SUPPLIER ONLY.
9 *P103 USED ON "A" CHASSIS ONLY.
2014 TV CHASSIS RUN 1 SERIES A & B
V 101A 1/2 6AW8A 4.5 MC. AMP
V 102 3DT6 F.M. DET. AUDIO AMP.
V 103 12CA5 AUDIO OUT
T 102
SP 101
VOLUME CONTROL
V 104A 1/2 5B8 1ST IF AMP.
V 105A 1/2 5B8 2ND IF AMP.
V 101B 1/2 6AW8A VIDEO AMP
V III 17CFP4
BRIGHTNESS CONTROL
CONTRAST CONTROL
CONNECT TO 10 OR 2 WHICHEVER GIVES BEST FOCUS.
V 105B 1/2 5B8 SYNC. CLIP
V 104B 1/2 5B8 VERT. OSC.
V 106 12W6 VERT. OUT
HEIGHT
VERT. HOLD
VERT. LIN.
V 110 1X2B - H.V. RECT.
L 110A VERTICAL DEFLECTION COILS
L 110B HORIZONTAL DEFLECTION COILS
V 107 6SN7 GTB HORIZ. OSC.
HORIZ. HOLD
V 108 25DN6 HORIZ. OUT
V 109 12D4 DAMPER
L 108 HORIZ. FREQ.
TUNER
V1 V2
V108 V103 V106
25DN6 12CA5 12W6
V109 V111 V107 V102 V101 V105 V104
12D4 17CFP4 6SN7 3DT6 6AW8A 5B8 5B8
CABINET GROUND
CHASSIS GROUND
REMOVABLE WIRE JUMPER
T 107 DETAIL
T 101 DETAIL
T 103 DETAIL
T 104 DETAIL
TOP VIEW
LOCATING KEY
SUPPRESSOR GRID INTERNALLY CONNECTED TO CATHODE (PIN 1) OF TRIODE SECTION
AGC
138V
LAST C SYMBOL C167
LAST R SYMBOL R175

CORONADO MODEL TV3-9402A

SCHEMATIC COURTESY OF GAMBLE-SKOGMO, INC.




PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

OLYMPIC
MODEL 1TY95L
CHASSIS "DY"

SCHEMATIC COURTESY OF OLYMPIC RADIO & TELEVISION, INC.